1-1975

1975-1976 Bulletin

GRADUATE ISSUE

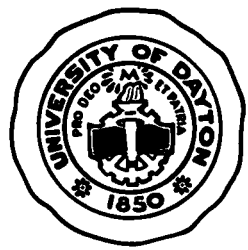
THE UNIVERSITY OF DAYTON BULLETIN

JANUARY, 1975

The Seal of the University of Dayton was created in 1920
when the school amended its articles of incorporation with the State of Ohio
to change its name from St. Mary's College. The date 1850
represents the original foundation of this institution.

The open book together with the geared wheel
fittingly conveys the interrelation between the humanities and the sciences
both illumined by the torch of God-given intellect and faith.
The flaming torch serves, moreover, to emblazon the letter "M"
proclaiming the Marian spirit of the religious organization (Marianists)
which conducts the University.

Finally the University's motto "Pro Deo et Patria" (For God and Country)
is a constant reminder that the completeness of education
lies in serving both God and mankind.



DAYTON, OHIO 45409

THE UNIVERSITY OF DAYTON BULLETIN

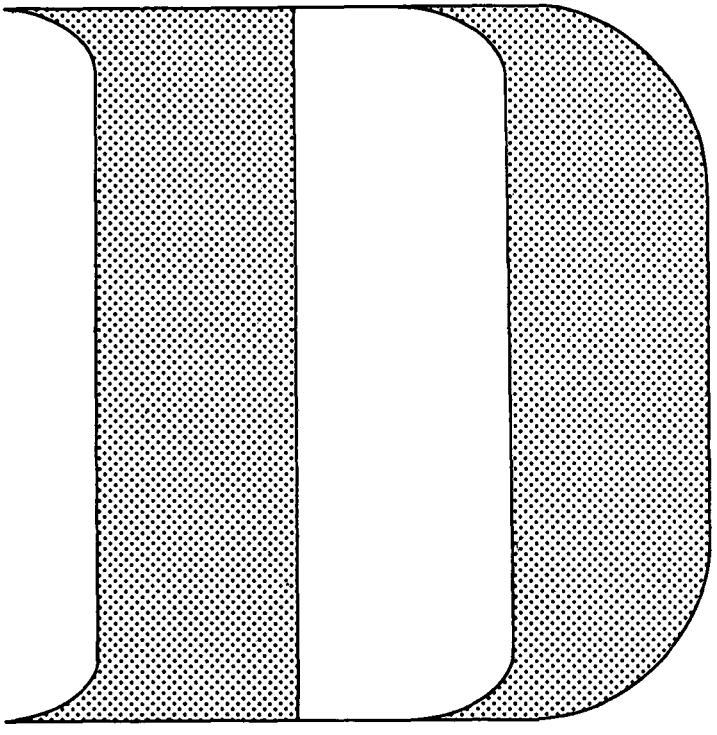
VOLUME LXXXVI JANUARY, 1975 NUMBER 1

Published by the University of Dayton, 300 College Park Avenue, Dayton, Ohio, 45409. Issued six times a year: once in January, once in February, twice in March, once in July and once in November. Second class postage paid in Dayton, Ohio.

The University of Dayton Bulletin includes the undergraduate bulletin issue, the graduate bulletin issue, the evening session bulletins, and the summer session bulletin. The provisions of the various issues of this Bulletin are to be considered directive in character and not as an irrevocable contract between the student and the University. The University reserves the right to make any changes that seem necessary or desirable.

The current number of any of these publications may be obtained by applying to the Office of Admissions.

University of Dayton Bulletin



Graduate Issue
1974-75
1975-76

College of Arts and Sciences
School of Business Administration
School of Education
School of Engineering

DAYTON, OHIO 45469

Academic Calendar

(*Proposed)

1975-1976		FIRST TERM
Sept. 4	Thur.	Classes begin at 8:00 a.m.
Sept. 10	Wed.	Last day for add in schedules
Oct. 11	Sat.	Homecoming—Saturday classes will meet
Oct. 13	Mon.	National Holiday—Columbus Day—No day class meetings—Evening and MBA classes will meet
Oct. 8	Wed.	Closing date for submission of Candidate for Graduation card
Oct. 18	Sat.	GRE Exam (file application 4 weeks in advance)
Oct. 27	Mon.	Veteran's Day—All classes will meet
Nov. 1	Sat.	All Saints Day—Saturday classes will meet
Nov. 1	Sat.	ATGSB Exam (file application 4 weeks in advance)
Nov. 26	Wed.	Thanksgiving recess begins after the last evening class
Dec. 1	Mon.	All classes resume
Dec. 8	Mon.	The Immaculate Conception—No day class meetings—Evening and MBA classes will meet
Dec. 11	Thur.	Graduation Candidates' last date to submit approved Thesis/Dissertation
Dec. 13	Sat.	Examinations—Saturday classes
Dec. 13	Sat.	GRE Exam (file application 4 weeks in advance)
Dec. 15-19		Examinations—Evening classes
Dec. 16-19		Examinations—8:00 a.m. - 5:00 p.m.
Dec. 19	Fri.	First Term ends after the last examination
Dec. 20	Sat.	Diploma exercises
		SECOND TERM
Jan. 7	Wed.	Classes begin at 8:00 a.m.
Jan. 14	Wed.	Last day for add in schedules
Jan. 17	Sat.	GRE Exam (file application 4 weeks in advance)
Jan. 24	Sat.	ATGSB Exam (file application 4 weeks in advance)
Feb. 11	Wed.	Closing date for submission of Candidate for Graduation card
Feb. 12-13		Faculty workshop—No class meetings
Feb. 16	Mon.	National Holiday—Lincoln-Washington Birthdays—No day class meetings—Evening and MBA classes will meet
Feb. 28	Sat.	GRE Exam—Aptitude test only (file application 4 weeks in advance)

1975-1976

Mar. 20	Sat.	ATGSB Exam (file application 4 weeks in advance)
Apr. 10	Sat.	Examinations—Saturday classes
Apr. 14	Wed.	Graduation Candidates' last date to submit approved Thesis/ Dissertation
Apr. 14	Wed.	Easter recess begins after the last evening class
Apr. 19	Wed.	Study day
Apr. 19-23		Examinations—evening classes
Apr. 20-23		Examinations—8:00 a.m. - 5:00 p.m.
Apr. 23	Fri.	Second Term ends after last examination
Apr. 24	Sat.	GRE Exam (file application 4 weeks in advance)
Apr. 25	Sun.	Commencement

THIRD TERM (First Session)

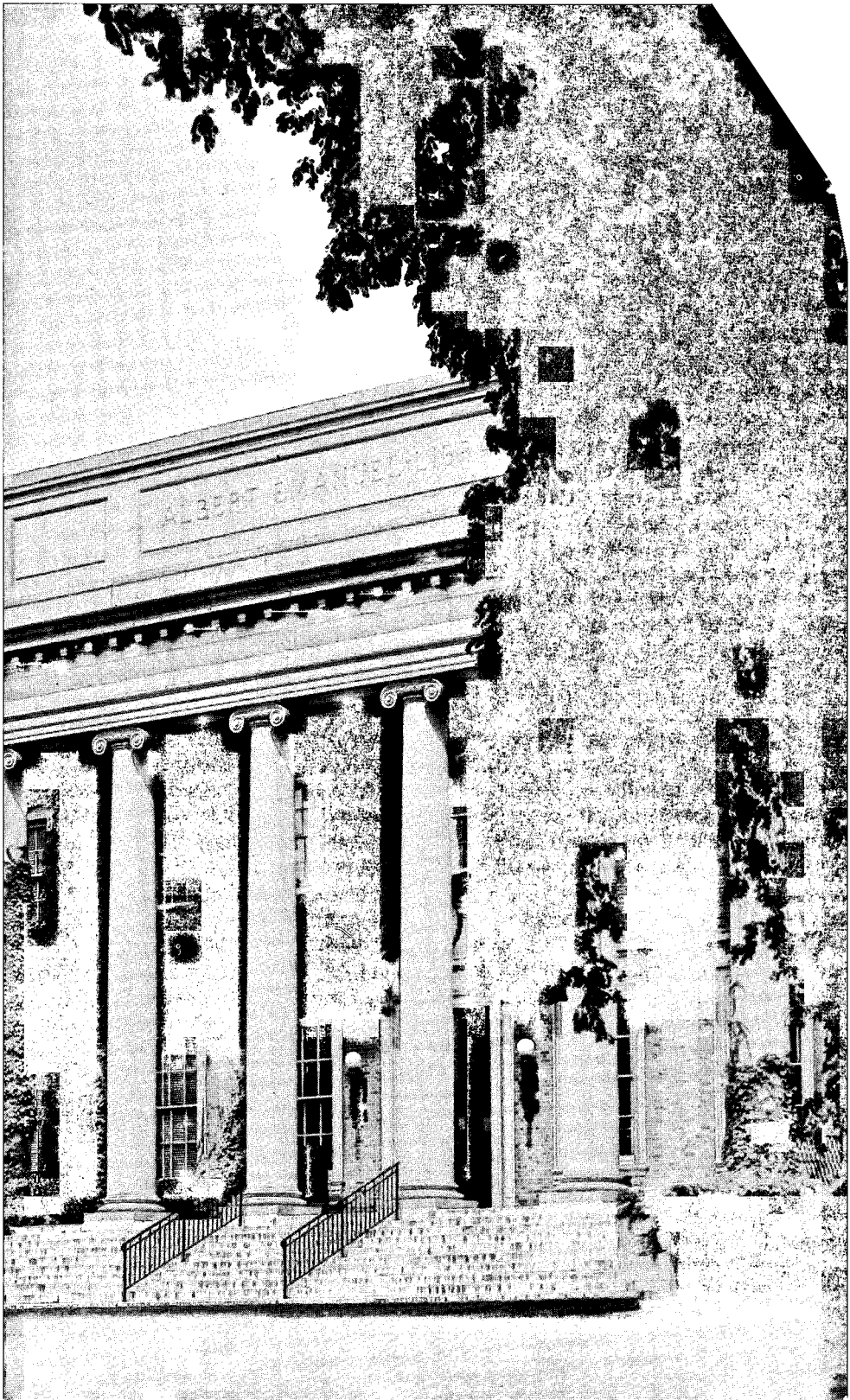
May 5	Wed.	Classes begin at 8:00 a.m.
May 12	Wed.	Last day for add in schedules
May 27	Thur.	Ascension—No class meetings
May 28	Fri.	No classes
May 31	Mon.	National Holiday—Memorial Day—No class meetings—MBA Classes will meet
June 1	Tues.	Closing date for submission of Candidate for Graduation card
June 12	Sat.	GRE Exam (file application 4 weeks in advance)
June 14-18		Examinations—Evening classes
June 17-18		Examinations—8:00 a.m. - 5:00 p.m.
June 19	Sat.	Examinations—Saturday classes
June 19	Sat.	Session ends after the last examination

THIRD TERM (Summer Session)

June 21	Mon.	Classes begin at 8:00 a.m.
June 28	Mon.	Last day for add in schedules
July 4	Sun.	National Holiday—Independence Day
July 5	Mon.	No classes—MBA classes will meet
July 10	Sat.	ATGSB Exam (file application 4 weeks in advance)
July 22	Thur.	Graduation Candidates' last date to submit approved Thesis/ Dissertation
July 26-30		Examinations—Evening classes
July 29-30		Examinations—8:00 a.m. - 5:00 p.m.
July 31	Sat.	Examinations—Saturday classes
July 31	Sat.	Session ends after the last examination
Aug. 1	Sun.	Diploma exercises

*The Official Academic Calendar for each term will be printed in every issue of the graduate composite of course offerings.

Table of Contents



I General Information

STATEMENT OF PURPOSE

The University of Dayton, operating in a pluralistic environment, deliberately chooses the Christian world view as its distinctive orientation in carrying out what it regards as four essential tasks: teaching, research, serving as a critic of society and rendering public service. The ultimate purpose of graduate work at the University is identical with this purpose.

The immediate objectives of a graduate school distinguish it from every other type or level of educational institution. Through its faculty, it seeks to create and maintain an academic atmosphere that is essential to graduate work. Its influence, therefore, extends first to its own membership, by promoting all forms of scholarly activity.

It labors further to give its students a thorough grasp of a chosen field of knowledge, special skills in methods of research, and sharpened powers of independent thought. Under the guidance and inspiration of a scholarly staff, students are given the constant use of library, laboratories, and other educational facilities. Above all, a graduate student is expected to bring marked initiative to his work and to assume full responsibility for the progress of his studies. The courses of instruction can be no more than the point of departure and a basis for wide reading and personal investigation.

The number of credit hours demanded for a graduate degree is merely the material requirement; the form and substance of graduate work are conceived as the mastery of a subject-matter with understanding of its relations to kindred branches of knowledge.

In short, graduate work, for the student at the University of Dayton, has for its purpose an integrated program of advanced study based on adequate undergraduate preparation in a specific field of study. It presupposes academic and personal maturity and makes more than average demand upon the initiative, the industry, and the scholarship of the candidates for an advanced degree.

ACCREDITATION

The University of Dayton is officially accredited by the following agencies:

The State of Ohio, Department of Education.

The North Central Association of Colleges and Secondary Schools.

The National Council for Accreditation of Teacher Education (for preparation of elementary and secondary school teachers).

The Engineers' Council for Professional Development for Chemical, Civil, Electrical, and Mechanical Engineering curricula; also for programs of Electrical, Industrial, and Mechanical Technology in the Technical Institute.

The University has the approval of the American Medical Association for its Pre-Medical program and of the American Chemical Society for its program in Chemistry.

INSTITUTIONAL MEMBERSHIP

The University holds institutional membership in the following associations: The Association of American Colleges; The American Association of Colleges for Teacher Education; The American Council on Education; The American Society for Engineering Education; Association of Graduate Schools in Catholic Universities; Council of Graduate Schools; The Institute for International Education; The International Council on Education for Teaching; The Midwest Association of Graduate Schools; National Association of Foreign Student Affairs; The National Catholic Educational Association; The Ohio Association of Counselor Educators; The Ohio College Association; The Council on Social Work Education; The Ohio Council for the Advancement of Educational Administration; Ohio Council on Advanced Placement; National Association of Schools of Public Affairs and Administration.

CONSORTIUM MEMBERSHIP

The University is a member of the following Consortia: Dayton-Miami Valley Consortium (DMVC); Consortium for Higher Education in Religious Studies (CHERS); Consortium of the Hebrew Union College Biblical and Archeological School of Jerusalem; and the all-Ohio and Dayton Cluster of Seminaries.

II Academic Information

ADMISSION

Men and women graduates of approved colleges or universities with a Bachelor's degree are eligible for admission. Applicants must have had an adequate undergraduate preparation in their proposed field of study and must show promise for pursuing higher studies satisfactorily. Additional requirements of specific curricula are noted in their respective portions of this bulletin.

A student is expected to assume full responsibility for knowing the regulations and pertinent procedures of the Graduate School as set forth in this publication and for meeting the standards and requirements expressed by these regulations.

APPLICATION FOR ADMISSION

Inquiries concerning admission and requests for application forms should be addressed to the Office for Graduate Studies or to the office of the Dean of the College or School. The application for admission to graduate work should be submitted by August 1 for the first term, by December 1 for the second term, by April 1 for the third term, and by June 1 for the second half of the split third term. It is the responsibility of the student that his application, with all the necessary supporting documents, be complete and in order. Registration as a graduate student will not be permitted, otherwise. Students anticipating use of the University Health Services must also file a medical record along with the application.

Students from foreign countries may be admitted to graduate courses for which they are prepared, and if found capable, may pursue a program leading to a degree. Applicants still residing in a foreign country are required to submit an Institute for International Education Request for Application Form for preliminary evaluation before an application for admission can be furnished. An International student must submit the following information along with his formal application for admission:

1. Test scores of the Graduate Record Examination (GRE) and the Test of English as a Foreign Language (TOEFL);
2. A medical questionnaire completed by a responsible medical authority certifying that the student's physical, mental, and emotional balance is adequate for the work he intends to undertake.
3. Evidence of sufficient funds to cover tuition costs for the first year, room and board and return transportation costs. Moreover, the international student must carry health insurance and be prepared to pay the first annual premium ($43.00) upon arrival at the University.

Foreign students should complete the application for admission to graduate work by July 1 for the first term, by November 1 for the second term, by March 1 for the third term. Original inquiries should be made at least one year before the term to which the student seeks admission.

There are no exceptions for foreign students to the above rules.

CLASSIFICATION OF STUDENTS

Regular Status

On regular status are students who have met satisfactorily all the general requirements of the school and the specific requirements of the department in which they are working.

Conditional Status

On conditional status are applicants who must fulfill some prerequisite imposed by the school or department before their admission to regular status. Included likewise are students from foreign countries whose native language is not English and those whose preparation cannot be adequately determined.

Unclassified Status

Students who belong to any of the following categories are considered as unclassified. These individuals will be considered as students of a school or the college but will not be officially enrolled in a graduate program leading toward a degree.

1. Non-programmed students, that is, students who fulfill all the requirements and are taking courses for credit, but are not seeking a degree;
2. Auditors, that is, properly qualified students who wish to follow graduate courses without working for credit. Auditors may be admitted to graduate courses with the permission of, and under the conditions required by the Dean. Tuition for auditors is the same as for students on regular status;
3. Transient students, that is, properly qualified students working toward a degree in another institution who have written authorization from the Dean of that institution to take specific courses at the University of Dayton for transfer of credit. Such students must satisfy all registration requirements in the given course that are mandatory for students working toward a degree at the University of Dayton.

Full Time-Part Time Status

The determination of the status as full or part time of Graduate Assistants, those engaged in research, *and in general of all graduate students* is made by the respective Chairman.

DEGREES

The University of Dayton offers advanced studies leading to a degree of Master of Arts, Master of Business Administration, Master of Clinical Chemistry, Master of Computer Science, Master of Public Administration, Master of Science, Master of Science in Education, Master of Science in Engineering, Master of Science in Engineering Management, Master of Science in Chemical Engineering, Master of Science in Civil Engineering, Master of Science in Electrical Engineering, and Master of Mechanical Engineering, Doctor of Philosophy, Doctor of Engineering.

SPECIFIC REQUIREMENTS FOR ALL DEGREES

Course Requirements

The College of Arts and Sciences and the Schools of Business Administration, Education, and Engineering offer programs variously distributed in time, leading to the Master's and Doctor's degrees. Specific requirements are listed in those sections of this Bulletin which describe these degrees.

Individual Interdisciplinary Program

A person desiring an individualized Interdisciplinary Program should contact the Dean for Graduate Studies and Research. A special form will be required along with the regular application form.

Residence Requirements

Residence requirements at the University of Dayton call for the equivalent of time normally demanded by the successful completion of twenty-four credit hours of graduate work. During the initial years of operation of any program, exceptions to this limitation may be made with the approval of the Dean concerned.

Minimum residence time requirement for students attending various combinations of terms is shown in the following table:

COMBINATION of TERMS	MINIMUM RESIDENCE
Students attending *ONLY* during regular academic year.	Two terms.
Students attending *BOTH* during regular academic year and third term.	Two terms or one term and two half terms.
Students attending *ONLY* summer sessions.	Three summer sessions, (i.e., three second-half of third term sessions).

The minimum residence time requirement will not in any case be reduced by the acceptance of transfer credit.

Time Limit

All requirements for a Master's degree must be satisfied within seven calendar years from the time of matriculation.

All requirements for a Doctoral degree must be satisfied within five calendar years after admission to candidacy.

Graduate Work in Other Institutions

A maximum of two courses of graduate work may be allowed in transfer from other accredited institutions provided the work is of "B" grade quality or better. The quality points are not transferred.

Usually no transfer credit will be allowed for courses taken more than five years previous to matriculation in the graduate schools of the University of Dayton.

During the initial years of operation of any new program, exceptions to this limitation may be made with the approval of the Dean concerned.

Registration of Undergraduate Students for Graduate Courses

An undergraduate student may register fo graduate courses only under the following conditions:

a. Graduate courses to count toward the undergraduate degree.
   1. Approval must be obtained from the Graduate Committee of the particular Graduate School offering the course.
   2. The student's total load must not exceed seventeen (17) hours.

b. Graduate Courses to count toward the graduate degree.
   1. Approval must be obtained from the Graduate Committee of the particular Graduate School offering the course.
   2. The student must be within fifteen (15) semester hours of completing credit hour requirements for graduation in his undergraduate program.
   3. The student's total load must not exceed seventeen (17) hours.
   4. Credit obtained for the graduate courses may not be counted toward both the Bachelor's and the future Master's degrees.
   5. The graduate tuition rates must be paid when registering in graduate courses for graduate credit.

Language Requirement

A reading knowledge of a foreign language may be required for a Master's degree at the discretion of the Department. Language courses for the convenience of graduate students can be taken by special arrangement on a class or tutorial basis, through the Chairman of the Language Department. No graduate credit is allowed for the fulfillment of these language requirements.

Grades and Examinations

To be in good standing a graduate student must have a 3.0 quality point average at all times.

Grades are expressed on the student's permanent record in the following manner:

A—Excellent ..... 4 quality points
B—Average ..... 3 quality points
C—Poor ..... 2 quality points
F—Failed ..... 0 quality points
K—Passed

Credit is given but no corresponding quality points are given. This is used by certain departments when the thesis or special courses are not to affect the 3.0 cumulative quality point average needed to be in good standing.

P—In Progress

For the thesis or for courses which have not terminated at the end of a semester. After the courses or thesis are completed the P's are replaced on the permanent record by an A, B, C, F, or K with the corresponding credit and quality point average.

I—Incomplete

To be used when a course has terminated but the student has not completed his work. The I has 0 quality points per credit and does affect the cumulative quality point average. It can be changed to a letter grade if the student has completed his work within a period of four months.

EM—Examination

This mark indicates credit given to students registered in the University either on the basis of examinations taken prior to or after admission to the University. The level of achievement which must be demonstrated by the student on these examinations is determined by the department in which the course is taught. Such credit, shall be assigned only on authorization of the Dean of the School or College in which the student is registered. No quality points are allowed.

Comprehensive Examination

A comprehensive examination is required in most programs. The examination may be oral or written, or both. Applications for all comprehensive examinations must be approved by the Chairman of the student's major department at least two weeks prior to the examination. Consult the explanation under each individual program for further details.

Thesis—Ph.D. Candidacy—Dissertation

In those departments requiring a thesis, an equivalent project, Ph.D. candidacy exam or Ph.D. dissertation: work may not be undertaken without the approval of the Department Chairman or of an advisor delegated by the Chairman; both the form and the content of the work must have the approval of at least three members of the Department, including the faculty advisor and the Chairman.

At least three final copies of a Master's thesis in approved form must be submitted by the student at least two weeks before graduation. Ph.D. students check Bulletin sections of the appropriate Department for candidacy-requirements, the number of copies of dissertation required and for the regulations governing topics and approval.

Withdrawals from Courses

Any withdrawal or change of course must be processed by an official Post Registration Change Form through the Office for Graduate Studies.

Use of Advanced Undergraduate Courses in the Graduate Program

1. Some but not all curricula permit the selection of designated upper-division (400) courses to be applied to the graduate program.
2. When upper-division courses are permitted for credit on the graduate level, in order to be accepted toward a degree, the work done shall be of "B" grade or better.
3. The graduate tuition rates must be paid when registering for graduate credit.

REGISTRATION

The responsibility for being properly registered rests with the student. Registration is required each term or session of all students who enter course work for credit; and of all students who wish to audit courses. The written approval of the proper dean or the designated advisor is required for admission to any course. Graduate Students must register at least ten days prior to the beginning term dates listed in the academic calendar. Any student who has interrupted the normal sequence of his graduate program is required to apply to the designated advisor or departmental chairman for permission to resume graduate study, at least two weeks prior to the first day of each term.

SEPARATION FROM THE UNIVERSITY

Separation from the University may follow upon graduation, withdrawal by the student, or dismissal.

The admission of candidates, their continuance and status, the awarding of academic credits, and the granting of a degree, are all subject to the ordinary regulatory powers of the University. It reserves the right to cancel, at its discretion. any of these privileges for reasons considered sufficient by its own governing body.

The various Deans reserve the right to review at intervals the work of their graduate students, and, in consultation with the Chairman of the Department, to recommend that those who are not doing work of a high caliber be advised to discontinue courses leading to a degree.

The disciplinary authority of the University is vested in the President by right, and in the Deans and other officers on whom jurisdiction may be conferred for specific cases and in restricted areas.

OFF-CAMPUS PROGRAMS

The University of Dayton maintains several off-campus centers for Graduate Study: MBA - Columbus and Lima, Ohio; Education - Lima, Ohio; and Engineering - Findlay, Ohio. These off-campus offerings come under the same regulations and conditions as courses meeting in University facilities on campus.

Although scheduling of off-campus classes follow the general pattern of the University calendar and time schedule, they do not necessarily conform to the on-campus tri-semester dates in all details.

The Graduate Composite for each term should be consulted for further information.

LIBRARY RESOURCES

The University of Dayton Library houses all general holdings, plus a concentration of titles in all fields of Graduate Study.

Specialized libraries are also open to graduate students as follows:

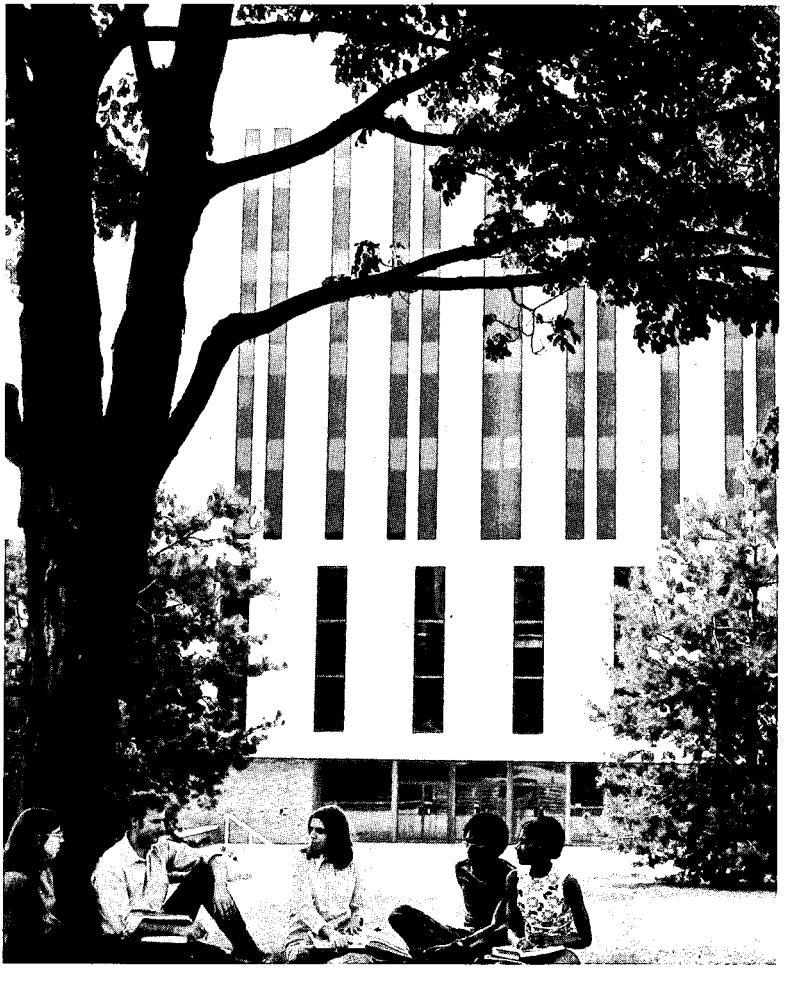
1. Mariology . . . Marian Library, Seventh Floor, University Library.

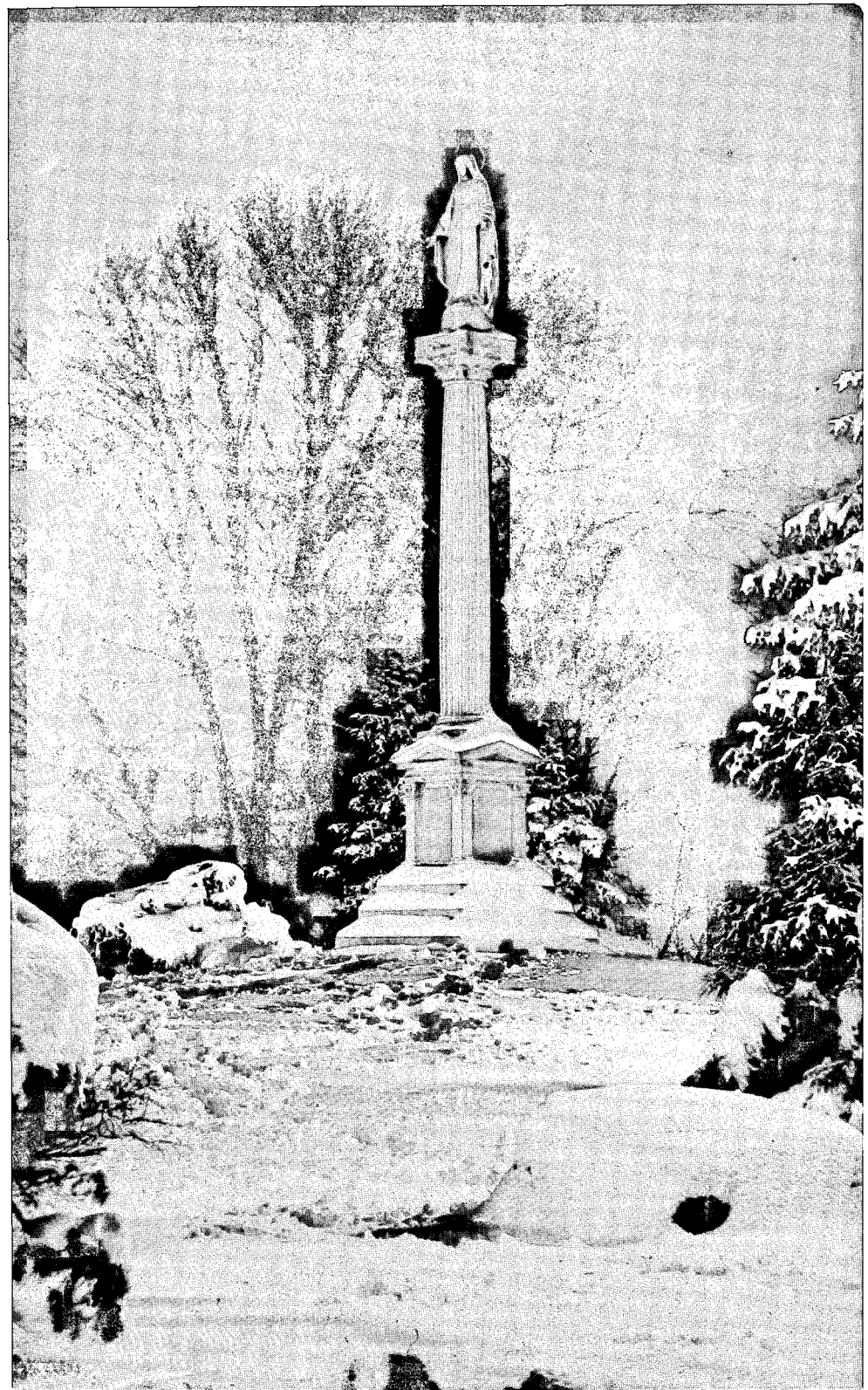
2. Education . . . Curriculum Library on the first floor of Chaminade Hall.
3. Other Libraries in the Area:

   There are several other libraries in the area available to graduate students. These include the public libraries, the Engineers' Club, Miami Valley Hospital, certain local industries, certain areas at Wright-Patterson Air Force Base, and the libraries of the affiliated institutions.

GRADUATE STUDENT ADVISORY COUNCIL

The Graduate Student Advisory Council is composed of a graduate student representative from each graduate program. This group meets regularly with the Dean for Graduate Studies and Research.





III Financial Information

GENERAL REGULATIONS

It is the rule of the University that tuition and fees are to be paid in full at the time of registration.

Where voluntary withdrawal, dismissal, illness, physical disability, or any extraordinary contingencies require a student to leave, he must notify the Chairman or Director of the Program in which he is enrolled.

EDUCATION OF VETERANS

All departments of the University have been approved by the Veterans Administration for training under the G.I. Bill. Veterans' affairs are handled by Mr. Robert Lowe, Veteran's Affairs Coordinator, second floor, Chaminade Annex. All veterans attending the University must contact his office. Counseling by the Veterans Administration is available in the Guidance Center. The following is the University policy on Veteran's hours: Full time—8 or more hours, 3/4—6 to 7 hours, 1/2—4 to 5 hours, less than 1/2—3 hours.

TUITION AND FEES

Tuition for Courses Taken for Undergraduate Credit

Per registered credit hour for lecture course (on campus only)	$50.00
Per clock hour for laboratory course	20.00

Tuition for Courses Taken for Graduate Credit

Per registered credit hour (except as noted below)	55.00
Engineering (off campus center)	70.00
MBA (off campus center)	70.00
Education (off campus center) qtr. hr.	29.00
School of Education (qtr. hr.)	29.00
Teachers, and administrators (sem. hr.)	45.00
Engineering doctoral student per credit hr.	65.00

Fees

Foreign Student Application	10.00
Matriculation fee, payable once	10.00
Basic University Fee, each term (on campus only) (This fee payable only once during the third term.)	15.00
Graduation fee	$26.00

TRANSCRIPTS

A transcript of the permanent academic record is a confidential document to be released only with the permission of the student except under due process of law. A transcript of record will be issued by the Registrar upon receipt of a request in writing. The student may request his transcript to be mailed to himself, another institution, or organization. The first copy of a transcript requested after graduation is a complimentary copy. All transcripts except the complimentary copy will require advanced payment of a dollar. The charge for transcripts ordered in lots of two or more is a dollar for the first copy and fifty cents for each additional copy.

CANCELLATION AND REFUNDS

Cancellations will be allowed only after the completion of the proper withdrawal forms. For refund purposes the effective date of cancellation is the date the student notifies the Office for Graduate Studies not the last day the student attended class. This date will appear on the withdrawal form forwarded to the Bursar's Office and will determine the amount of refund due.

Students who discontinue class attendance without officially completing the withdrawal procedures during the cancellation period will be responsible for the full amount of the applicable tuition and fees.

During the four-week cancellation period for the first and second terms, the tuition charges will be made according to the following schedule:

During the first week of classes	20%
During the second week of classes	40%
During the third week of classes	60%
During the fourth week of classes	80%
During and after the fifth week of classes	100%

During the two-week cancellation period for each session of the split third term the tuition charges will be made according to the following schedule:

During first week of classes	35%
During second week of classes	70%
During or after third week of classes	100%

STUDENT HEALTH SERVICES

The Health Center, located in the C. H. Gosiger Memorial Health Center Building is open from 8 A.M. to 7 P.M. weekdays and from 8 A.M. to 3 P.M. Saturdays. At all other times only emergency care is available. The doctor's hours are 9 A.M. to 3:30 P.M. weekdays.

All full-time and part-time graduate students who wish to make use of Health Center facilities, are required to submit a pre-admission health form, including a report of a doctor's examination and recent chest X-ray, directly to the Health Center before admission to Graduate Studies. The proper form for this purpose may be obtained from the Office for Graduate Studies; no other

forms will be accepted. Graduate students may not use the Health services unless a properly completed health form is on record.

HOUSING

Ordinarily, there are no university-owned accomodations available during the first and second terms. Those interested in obtaining information regarding off-campus housing may contact the Housing Office (229-3317), Gosiger Health Center.

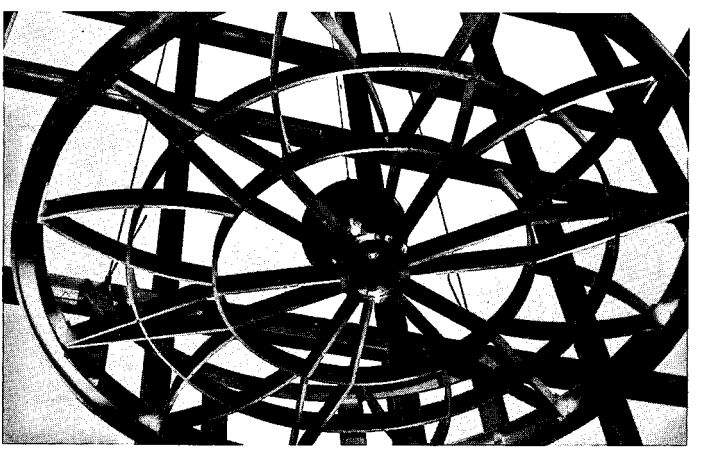
PARKING

Parking facilities are extremely limited on the Main Campus at the University of Dayton. Parking between the hours of 8:00 AM and 5:00 PM is very rigidly enforced, therefore, one should be familiar with the regulations in order to avoid problems. Parking permits are sold at a $5.00 minimal fee in order to cover printing and other minor related costs. Between the hours of 8:00 AM and 5:00 PM, one must obtain the proper color coded decal corresponding to the lot in which he desires to park. After 5:00 PM daily and on weekends, all university lots (not restricted zones) are open for the parking of any university permit holder. Evening students may purchase an evening permit at the same $5.00 cost, however, this is not to be utilized between 8:00 AM and 5:00 PM without an accompanying visitors or temporary pass. Applications may be found at the Campus Security traffic office located in Benisek Hall or at either traffic control stations. Permits will be issued from the traffic office, with the exception of temporary permits issued at the traffic control stations (gates).

ASSISTANTSHIPS

A limited number of Graduate Assistantships are available to students who are qualified. These carry a stipend and tuition remission for courses required for the degree. Recipients are expected to complete the requirements for the Master's degree in two years.

Detailed information and forms for making application may be obtained from the chairman or director of the proposed graduate program.



IV College of Arts and Sciences

The objectives of graduate work in the Arts and Sciences coincide with the general aims and philosophy of education that characterize the University of Dayton. Specific objectives and requirements of the several departments are presented in the following programs:

GRADUATE PROGRAM IN AMERICAN STUDIES

Statement of Purpose:

American Studies is an ambitious attempt to come to grips in a new way with the species "man," to see how he was and how he is in order to improve the ways he will be. It studies American man because his words, his deeds and his thoughts, his civilization and culture, both past and present, are comparatively easy to search out, to analyze and to understand. It also studies American man because upon him and his culture, more than any other, rests the proximate fate of the world.

The candidate for the master's degree in American Studies is prepared for a career in teaching, journalism, business, public service, law and library work, among others; and, indeed, may enter the program as a working professional in order to broaden and deepen his knowledge and understanding.

Specific Requirements of the Program:

Applicants must have achieved a baccalaureate degree and must have completed at least seventy-two hours in any combination of American Studies, Anthropology, Economics, Education, English, Fine Arts, History, Music, Philosophy, Political Science, Psychology, Sociology, and Theological Studies.

The student will take thirty to thirty-six hours of courses, three to nine in American Studies depending upon his undergraduate preparation. The remaining twenty-seven hours will be taken in two to four of the cooperating disciplines, not less than six nor more than eighteen in any one discipline. Courses must be chosen, with the help of a faculty adviser, from at least two of the groups.

When he is accepted into the program, the student must designate, as accurately as he can, which of the cooperating disciplines he wishes to study for his degree, and his earliest studies must include courses in at least two of those disciplines.

As early as when the student is accepted into the program, but not later than when he completes any course, his faculty adviser will determine if he shall take AmS 300 or AmS 301 or both. The student will take whichever of these are to be part of his requirements in the next term(s) in which it (they) are offered or must interrupt his progress until he does.

When he has completed twelve graduate hours toward his M.A. in American Studies, the student will sit for an examination designed to determine his ability to integrate or at least to make sophisticated comparisons among bodies of information from at least two of the disciplines he has chosen to study for his degree. The examination will be composed and the answers evaluated by a committee of faculty from American Studies and the disciplines in which the student is working.

In his last term the student will take AmS 590, Interdisciplinary Research. In essence this is a master's thesis course which provides the student contact with a teacher and other similarly occupied students on a regular basis. The end product of the course is the final achievement of the student's program: a self-designed study of information from at least two disciplines demonstrating a mature ability to produce scholarship from the integration or from the comparison of the two.

These are the courses from which the student chooses:

GROUP A

ENGLISH

Eng. 570. Studies in Early American Literature
Eng. 572. The Romantic Age in American Literature
Eng. 576. Major American Writers
Eng. 582. Studies in American Literature Since the Civil War
Eng. 593. Survey of Linguistics

GROUP B

FOUNDATIONS OF EDUCATION

EdF. 502. Comparative Philosophies of Education
EdF. 550. History of Higher Education in the United States

HISTORY

Hst. 552. Revolution and Confederation
Hst. 553. American Colonial History
Hst. 554. The Age of Jefferson and Jackson
Hst. 555. The Old South
Hst. 556. Civil War and Reconstruction
Hst. 572. Appalachia and the New South
Hst. 574. The Gilded Age 1877-1900
Hst. 575. The Progressive Period, 1900-1920
Hst. 576. Between the Wars
Hst. 577. Contemporary American History
Hst. 578. Intepretations in American History
Hst. 660. Studies in U.S. History Before 1877
Hst. 670. Studies in U.S. History After 1877

PHILOSOPHY

Phl. 550. Philosophy of History
Phl. 563. The Philosophy of C. S. Peirce
Phl. 565. American Pragmatism

Phl. 570. Existentialist Philosophy
Phl. 571. Perception and Knowledge
Phl. 575. Contemporary Philosophies of Evolution
Phl. 577. Recent Non-Thomistic Christian Thought
Phl. 580. Contemporary Naturalism and Realism
Phl. 592. Analytic Philosophy

THEOLOGICAL STUDIES

Thl. 560. Theological Movements
Thl. 573. Evolution and Ethics
Thl. 582. Religious Education in Context
Thl. 583. Religious Psychology
Thl. 592. Contemporary Issues

GROUP C

ECONOMICS

Mba. 500A. Graduate Survey in Economics
Mba. 540. Managerial Economics
Mba. 541. Labor Relations and Labor Economics
Mba. 545. National Economic Policy and Forecasting
Mba. 550. Government and Business
Mba. 570. Business and Society

FOUNDATIONS OF EDUCATION

EdF. 501. Advanced Psychology of Learning
EdF. 518. School and the Social Order

POLITICAL SCIENCE

Pol. 508. Seminar: American Foreign Policy
Pol. 521. Intergovernmental Relations
Pol. 545. Seminar: Urban Politics
Pol. 557. Seminar: State Government and Politics
Pol. 560. Seminar: American Political Thought
Pol. 571. Seminar: Constitutional Law
Pol. 573. Seminar: Civil Liberties
Pol. 574. Seminar: American Politics

PSYCHOLOGY

Psy. 517. Small Groups Function
Psy. 522. Developmental Psychology
Psy. 522. Advanced Cognitive Processes
Psy. 530. Verbal Learning
Psy. 536. History of Psychology as a Human Science I
Psy. 537. History of Psychology as a Human Science II
Psy. 567. Theories of Personality
Psy. 585. Experimental Social Psychology

AMERICAN STUDIES

AmS. 590. Interdisciplinary Research
AmS. 300. American Cultures
AmS. 301. Interpretations of American Culture

GRADUATE PROGRAMS IN BIOLOGY

The Biology Department offers programs leading to M.S. and Ph.D. degrees. Students who show outstanding ability may by-pass the M.S. degree and proceed directly toward the Ph.D. degree.

The degrees are in Biology, but each student's program is tailored to his own interests and career plans. Specialization is accomplished by selection of courses, by choice of thesis or dissertation topic, and by participation in weekly seminars in the area of interest. The specific program is determined after consultation between the student and his advisory committee. Primarily to answer the needs of those already in scientific or teaching professions, the Biology Department also offers a Master of Science program without a thesis requirement. Three major areas of specialization are available. These areas and typical spectra of courses available are:

MICROBIAL AND CELLULAR BIOLOGY

Bioinstrumentation
Biochemistry
Advanced Biochemistry
Bacteriology
Bacterial Physiology
Advanced Microbiology
Pathogenic Bacteriology
Clinical Microbiology
Immunology and Serology
Biochemical Genetics
Parasitology
Virology
Algae and Fungi
Cell Physiology
Electron Microscopy

ECOLOGY AND EVOLUTIONARY BIOLOGY

Community Ecology
Population Ecology
Vertebrate Morphology
Lower Plants
Higher Plants
Invertebrate Zoology
Biometrics
Vertebrate Paleontology
Evolutionary Ecology
Field Biology
Biosystematics

BIOFUNCTION

Bioinstrumentation
Radiation Biology
Plant Physiology
Endocrinology
Immunology
Genetics
Biochemistry
Advanced Biochemistry
Embryology
Physiology
Comparative Animal Physiology
Cell Biology
Electron Microscopy

Admission Policies

Individuals possessing a bachelor's degree from an accredited school may be admitted to full graduate standing if their grades are well above the average required for the bachelor's degree. Those with lower averages may be considered for acceptance on a probationary status, in which case particular attention will be given to the last 60 semester hours of their undergraduate program. Applications are also accepted from holders of the M.S. who are qualified for doctoral work. Admission to the Ph.D. program at the University of Dayton requires research experience equivalent to the M.S. thesis. Ordinarily, a student will not be accepted into a Ph.D. program unless funds are available to help support him.

Applicants should have the equivalent of the science and mathematics requirements of the University of Dayton's B.S. in Biology. These include calculus, physics, and organic chemistry, plus sufficient background in biology to demonstrate a knowledge of cell biology, genetics, development, and environmental biology. Normally, a student who lacks more than one prerequisite will not be admitted to full graduate status; although the summer session prior to entry can be used to remove deficiency.

Academic Program

Each new student is assigned a provisional advisor who assists him during the first semester. Prior to registration for the second semester each student selects a major professor who serves as chairman of the student's advisory committee. The composition of this committee is representative of the general field of study in which the student expects to work.

The committee helps to plan the student's entire program. Prior to the beginning of the second semester of the M.S. program the student declares his choice of thesis or non-thesis option. The option may not be changed later than the Qualifying Examination period. The committee generally meets with the student twice a year to offer suggestions and to assess progress in the program and thesis research.

Master of Science The M.S. degree usually requires 24 semester hours of course work plus a thesis. A typical M.S. program includes in the 24 hours: four semesters of Bio. 601 (special topics in the area of specialization); Bio. 552-553 Biological Instrumentation and supporting courses from the area of interest.

Students declaring the non-thesis option are urged to complete both Bio. 552 and 553 in order to increase laboratory experience in the absence of thesis research. In some cases a research paper may be necessary.

All students are expected to attend Bio. 501, Departmental Seminar, each semester. This is considered to be an important unifying experience for all aspects of the graduate program.

Doctor of Philosophy There are no set course requirements for the Ph.D. degree; each student follows the program mapped out for him by his committee. In practice many students find it helpful to take 40 to 50 semester hours of graduate course credits to attain the level of competence suitable for a doctoral candidate.

When it is desirable, a student will be encouraged to take some work at neighboring institutions or summer laboratories.

Program Evaluation

The program is centered around development of professional competence. Each student is assessed in this regard by the following steps: a preliminary diagnostic evaluation which is made at the beginning of the student's program; a qualifying examination taken at the beginning of the second year of full time graduate study; a candidacy examination concerning his area of specialization (Ph.D. students only); and a defense of thesis.

Preliminary Evaluation An orientation program will be presented to introduce new students to the Department. During this period, there will be an assessment of the student's background knowledge of biology. This will be accomplished by means of written examinations designed to evaluate his familiarity with the concepts covered in this Department's core program of courses covering cell biology, genetics, developmental biology and environmental biology. Based on the outcome of these examinations and after consultation with the faculty, a student may wish to enroll in one or more of the core undergraduate courses to insure that he has a sufficiently broad base for his professional career. Normally no graduate credit is given for these courses.

Qualifying Examination At the beginning of his second full year of graduate work, the student will take a qualifying examination. The purpose of the examination is to aid the student's committee in planning the remainder of his program. The examination will cover basic biological concepts, subject matter of graduate courses taken, and broad areas of the student's specialty. The emphasis will be placed not only on facts, but on the student's ability to express himself, to reason, and to integrate his knowledge. Depending on the outcome of this examination and his overall performance during the first year, the student then completes the requirement for the M.S. degree or withdraws from the program. Students showing outstanding ability and wishing to proceed towards the Ph.D. degree may be given the option of by-passing the M.S. degree.

Students who choose to complete a Master's degree are considered candidates for that degree after the qualifying examination. A student who wishes to continue beyond the Master's degree will be advised to continue for the doctorate or to terminate his studies at the University on the basis of his performance in earning the Master's degree.

Ph.D. Candidacy Examination This oral examination for Ph.D. students is administered by the advisory committee which may be supplemented by members requested by the committee or the department chairman. The examination will be taken no later than the student's sixth semester of full graduate standing or, for students who possess a Master's degree in an appropriate field when they enroll, no later than the fourth semester. The purpose of the examination is to judge the student's competence in his special area and in related fields. Following the examinations the student may be directed to: a) complete his dissertation

b) strengthen his preparation by demonstrating competence in one or more areas, c) withdraw from the program. At the committee's discretion, additional competence in an area may be demonstrated by special examination or by completion of specific courses to the committee's satisfaction. The student is considered a candidate for the Ph.D. degree after successful completion of these requirements.

Defense of Thesis or Dissertation The examination on thesis, whether for the M.S. or Ph.D., will constitute an oral examination on the matter of the thesis or dissertation. Normally the student presents a seminar on his thesis research within the week following his examination. A student must present his dissertation for defense within five years after admission to candidacy or he must repeat the candidacy examination. A suitable examination will be arranged for those students taking a non-thesis M.S. degree. Those working toward the Master's degree must complete their program within five years after admission to full graduate standing.

Tools of Research Since the needs of the individual Ph.D. student vary with the background and type of research chosen, the requirement for tool(s) of research will be determined by his committee. These tools of research are normally for Ph.D. candidates only and, if required, may include one or two of the following: a reading knowledge of French, German, Russian, or Spanish; ability to program a digital or analog computer.

Residence Requirement A student is strongly advised to devote his full energies to his graduate studies. Normally he must attend the University as a full time student for one full year in order to satisfy the residence requirement for the M.S. and for two full years in order to satisfy the residence requirement for the Ph.D. If his advisory committee encourages him to spend a semester or a summer as a full time student at a neighboring institution, he may use that time to satisfy the residence requirement.

GRADUATE PROGRAMS IN CHEMISTRY

Statement of Purpose:

The purpose of the Master's program in Chemistry is to present to the student a rigorous approach to modern theories in Chemistry, and to increase his desire and potential toward fundamental research through a program of literature search and laboratory experimentation.

Specific Requirements of the Department:

a. Undergraduate prerequisites: The undergraduate prerequisites shall be the minimum requirements specified by the American Chemical Society. Those students who have graduated from A.C.S. approved schools will have fulfilled these requirements. Others may have to take certain courses concurrently from the undergraduate program to meet A.C.S. requirements.

b. All candidates for the degree Master of Science in Chemistry are required to submit proof of their ability to do independent work. Normally this proof takes the form of a thesis. Additional coursework may be substituted if the student has previously demonstrated research proficiency commensurate with the Masters Degree as judged by the Departmental Graduate Committee.

c. Twenty-four credit hours of course work and six hours of research are normally required for the Master's degree in Chemistry. The twenty-four course credits must include at least three credits in each of the major fields of organic, physical and inorganic chemistry. The remainder of the student's program is decided upon between the student and his advisor.

d. Electives in other departments may be chosen with the approval of the Departmental Graduate Committee.

e. Written examinations are given to assist the student and advisor in formulating the student's program.

Biochemistry Option:

This program is designed for those students who are planning a career in biochemistry or the medical sciences.

Students who want to specialize in biochemistry should have undergraduate preparation in general, analytical, organic and physical chemistry. The degree will require twenty-four hours of approved course work and 6 hours of thesis research.

GRADUATE PROGRAM IN CLINICAL CHEMISTRY

Statement of Purpose:

The purpose of the Master's program in Clinical Chemistry is to provide to the student, advanced training in basic chemistry, in analytical procedures, in modern biochemistry and clinical chemical research. It will also prepare the student for an advanced degree (Ph.D.) program in Clinical Chemistry.

Specific Requirements of the Department:

a. Undergraduate prerequisites: Candidates for the degree are required to have a minimum of 20 hours of chemistry (General, Quantitative, and Organic Chemistry). Typical students will have completed a Bachelor's Degree in areas such as Medical Technology, Chemistry, Biology, or Pre-professional Studies (pre-med, pre-dent).

b. All students are required to have clinical laboratory experience. A training program available through cooperation of local hospitals is required of all students.

c. Credit for certain undergraduate courses may be allowed at the discretion of the Departmental Committee.

d. Chemistry 525, 525L, 526 and 526L, Principles of Organic Chemistry, may not be taken for credit in this program.

e. The normal requirements for the Master's Degree are 24 credit hours in course work and 6 credit hours for an approved thesis and oral defense of thesis. Six credit hours in course work may be substituted for the thesis work, if the candidate can show previous experience in Clinical Chemistry Research and whenever this exception will

not prejudice his program. Approval of the Departmental Committee is required for waiver of thesis work.

f. Each candidate, in consultation with an advisor will select a program of studies designed according to the student's goals and background, to fulfill the requirements for the Master's Degree. The program, and any subsequent changes, must be approved by the Departmental Committee.

A suggested program is:

Course		*Credits*
CHM 530	Physical Chemistry	3
CHM 415	Analytical Chemistry	3
CHM 531 & 531L	Identification of Organic Compounds	3
CHM 551 & 552	General Biochemistry I & II	6
CHM 555	Special Topics in Clinical Chemistry	1-3
CHM 557-558	Applications of Clinical Chemistry I and II	2
CHM 559	Clinical Chemistry Laboratory	3
BIO 550	Biometrics	3
CHM 560-561	Research	6

Individual candidates may find courses of interest in the Graduate Chemistry Curriculum, the Biology Curriculum, Department of Business Management, and other departments.

GRADUATE PROGRAM IN COMMUNICATION ARTS

Statement of Purpose:

Appreciation is shown for the significant traditional aspect of the academic discipline involved in Communication Arts which can be directly linked to the inventions and refinements of the Classical Greek Period; subscription is made to the Aristotelian concept of discovering all possible means of persuasion on any given subject and the utilization of these means in the process of the classical categories of Ethical, Pathetic and Logical proofs.

A critical need is present in our time for a continuous analysis of the basic principles and the constant development of the necessary skills to meet the ever-present challenges of the modern interpersonal relations ranging from the local to international levels of communication.

Admission Requirements:

The applicant for graduate study in the Department of Communication Arts must meet the following requirements:

1. A Bachelor's degree from a recognized institution of higher learning. In the case of seniors who have almost completed graduation requirements, the Graduate Committee of Communication Arts may permit the taking of graduate courses which will be applied to the MA degree only after the appropriate Bachelor's degree has been awarded.

2. A 2.8 cumulative point average (or the equivalent). The Graduate Committee within the Department will recognize the potential merits of professional experience and maturity in a specific field as a factor for consideration relative to the student's ability.
3. Demonstrate through the medium of undergraduate studies, or professional accomplishment and growth, coupled with satisfactory undergraduate studies, a competent cultural background.
4. Twenty-four semester hours in an area of Communication Arts or demonstrate equivalent skill in a particular field, coupled with satisfactory undergraduate studies.
5. Demonstrate the possession of a comprehensive background in theory and the necessary skill in oral communication.
6. Applicants for an interdisciplinary program must demonstrate the possession of a substantial background in both the major and minor areas of study.
7. Applicants who do not meet the above requirements and yet wish to pursue the graduate program in Communication Arts may, at the discretion of the Graduate Committee of Communication Arts, be admitted as unclassified students. Such students will be assigned appropriate undergraduate credits which will not count toward the graduate degree.
8. Transfer of graduate credit from accredited institutions of graduate learning will be reviewed by the Graduate Committee and may be accepted up to a maximum of six hours.

Course Requirements:

Plan A (Communication Arts Only)

1. The student may elect to complete 24 hours of course work and six hours of thesis credit (including an oral defense of the thesis), or
2. 30 hours of course work followed by an oral comprehensive examination.

Plan B (Communication Arts and Interdisciplinary Study)

1. The student may elect to complete not less than 18 hours of study in Communication Arts and not more than 12 hours of study in one of the interdisciplinary areas followed by an oral comprehensive examination by a committee composed of Communications Arts faculty members and a faculty representative from the interdisciplinary area involved, or
2. 12 hours of study in Communication Arts, six hours of thesis credit, and 12 hours of study on one of the inter-disciplinary areas followed by oral comprehensive examinations on both the course work and thesis. The oral comprehensive committee for course study will include both Communication Arts faculty and a faculty representative from the interdisciplinary area; the thesis *must* be done in an area of the communication arts and its oral comprehensive examination committee will be composed of Communication Arts faculty only.

Graduate courses leading to the Master of Arts degree in Communication Arts

Com 506	Ethics of Communication	3 cr. hrs.
Com 511	Persuasion Techniques	3 cr. hrs.
Com 516	Barriers to Effective Communication	3 cr. hrs.
Com 521	The Investigation of Listening Problems	3 cr. hrs.
Com 526	Studies in Communication Skills	3 cr. hrs.
Com 530	Development of Mass Media	3 cr. hrs.
Com 531	Problems—Seminar	6 cr. hrs.
Com 536	Communication Theory	3 cr. hrs.
Com 598-599	Thesis	3 each. cr. hrs.

Option Courses—Equivalent of Thesis Requirement:

Com 555	Public Relations Workshop	3 cr. hrs.
Com 561	Rhetorical Criticism	3 cr. hrs.
Com 566	Argumentation	3 cr. hrs.
Com 571	History of Public Address	3 cr. hrs.
Com 591	Public Relations Internship	3 cr. hrs.

Communication Arts and Interdisciplinary Study

Certain offerings from the MBA, English, Psychology and Political Science programs have been designated as appropriate for Communication Arts Interdisciplinary Study. A consultation with the Chairman of the Department concerned is required. Information on applicable courses may be obtained from the Department of Communication Arts.

GRADUATE PROGRAM IN COMPUTER SCIENCE

Statement of purpose:

The Master of Computer Science (MCS) program is a professional degree program designed primarily for the manager, engineer, educator or technician involved in computer-related activities whose undergraduate education has been in a field other than Computer Science.

The program is not designed as a preparation for the Ph.D., although it may serve this purpose in certain cases.

Specific requirements of the department:

Students in the program must be graduates of an accredited college with a nominal background in mathematical thinking. No specific undergraduate mathematics courses are required; several of the graduate courses, however, have calculus as a prerequisite.

Students should have a knowledge of a higher-level programming language such as Fortran, PL/I or Cobol, and knowledge of an assembly language. Deficiencies in this area may be met by private study or by taking undergraduate courses such as Cps 144: Fortran Programming, Cps 145: Cobol Programming, Cps 245: Assembler Programming.

The degree requires 30 graduate credits, 12 of which may be taken from departments other than Computer Science. There is no foreign language requirement, and there

is no formal thesis requirement. There are no specific course requirements; each student's program requires only approval of his faculty advisor.

Questions on procedures for admittance to the program should be directed to the Office for Graduate Studies, 229-2343. Other questions may be directed to the department, 229-3831.

GRADUATE PROGRAM IN ENGLISH

Statement of Purpose:

The Master's program in English is designed to offer the opportunity for an intensified study of English and American literature, and to develop in the student a competence in independent research and in the exercise of sound literary judgment.

Specific Requirements of the Department:

a. Undergraduate prerequisites: The student seeking admission must have completed studies in English and American literature which will enable him to pursue his graduate studies with distinction. He will ordinarily have completed, with a grade point average of at least 3.00, twenty-four semester credit hours in literature, of which at least eighteen hours were in upper-division courses. Graduate Record Examination scores may be required as part of the applicant's materials.

b. Specific degree requirements: Normally thirty credit hours are required. Every applicant, after twelve hours with a grade of at least 2.75, will be given a diagnostic examination and interview. Exceptionally well qualified students could earn the master's degree in less than thirty hours; students with deficiencies may be required to take up to thirty-six graduate hours.

c. Obligatory courses: English 595, Research and Bibliography, and either English 587, Studies in the History of Criticism, or English 588, Studies in Criticism, are required of all applicants for the degree. The remainder of the student's program should be equally divided between courses from sequence 514 through 542 and sequence 546-582.

d. A thesis upon a topic approved by the Graduate Committee of the Department for which six hours are granted can be accepted if the interview committee recommends this option.

Course Offerings:

Courses will be offered during the late afternoons or evenings and on Saturday mornings during the First, Second, and first half of the Third Term and during the evening and in the day in the second half (the summer session) of the Third Term.

GRADUATE PROGRAM IN HISTORY

Statement of Purpose:

The Department of History through its graduate program seeks to develop in

the student that combination of mature judgment and scholarly competence associated with the ability to make, compare, test, and evaluate historical conclusions and interpretations.

As a secondary purpose, the program is designed to prepare the student for a successful career in teaching, government services, or specific fields of private endeavor.

Specific Requirements of the Department:

a. A Research Seminar, History 601, is required of all students in the Master Degree Program in History.

b. The Candidate must take at least three 600-level courses in addition to History 601, and in the case of thesis writers, History 699.

c. Up to six credit hours of work may be taken outside the History Department with the approval of the chairman.

d. No more than two independent study courses (History 696) may be taken with the same professor.

e. Foreign Language Requirements:

A language examination is required for:

1. All graduate assistants;
2. All other wanting recommendations for further graduate work

A student may choose to show his competence in any foreign language pertinent to his major area.

OPTION A

A. Thirty credit hours of acceptable course work and research including three credits for History 601 (Research Seminar), six credits for the thesis (History 699), and three other 600-level courses. The thesis should be 80 to 160 pages in length, and it should stylistically conform to Turabian. Three years from the time it is begun are to be allowed for the completion of the thesis, but in case of extenuating circumstances, the time allotment can be extended. Three copies of the thesis are required, and approval is by the director and two readers chosen by the director.

B. An oral comprehensive examination in the field of the thesis taken concurrently with the oral on the major area chosen by the student.

OPTION B

A. Thirty-three credit hours of acceptable course work including three credits for History 601 (Research Seminar), and three other 600-level courses exclusive of History 699 (See b above).

B. This program is recommended for students who do not plan to enter a doctoral program.

Course Offerings:

Courses will be offered in the late afternoon and evening hours for the convenience of teachers and other employed persons except during the Third Term, Second Session, when courses will be offered primarily in the morning hours.

GRADUATE PROGRAM IN MATHEMATICS

Statement of Purpose:

The Department proposes to offer graduate studies in Mathematics in order to give an opportunity for properly prepared persons to acquire skills in those branches of Mathematics normally studied after the Baccalaureate degree. The curriculum is intended to serve as a firm basis for doctoral studies and research.

Specific Requirements of the Department:

a. Undergraduate prerequisites:

   Mth 361 Introduction to Abstract Algebra (or equivalent)
   Mth 421-2 Advanced Calculus (or equivalent)

b. Requirements for the Degree:

   1. Thirty hours of 500 level courses: These may include a maximum of 6 hours of approved courses outside the department; a maximum of 6 hours for a thesis in special cases.
   2. The student must successfully pass a written examination covering the content of his area of concentration as well as an oral examination, within three months of the expected date of graduation.

GRADUATE PROGRAM IN PHILOSOPHY

Statement of Purpose for the M.A. in Philosophy:

The purpose of the graduate program in philosophy is to provide the conditions for cooperative study and research in which a student can: acquire a more comprehensive knowledge and understanding of major philosophical positions in the history of philosophy and in contemporary philosophy; develop his or her abilities for critical philosophical reflection; and learn to apply philosophical principles to the solution of present-day problems.

Statement of Scope for the M.A. in Philosophy:

Students have been able to pursue programs of graduate study in philosophy preparing them for doctoral studies in philosophy and other academic areas, as well as for teaching and counselling responsibilities in philosophy at the four-year and two-year college level. Still others have pursued the program out of a general interest in advanced philosophical studies or in conjunction with further professional studies.

Requirements for the M.A. in Philosophy:

Students working toward the Master of Arts degree in Philosophy are subject to the general graduate policies and requirements of the University and the College of Arts and Sciences. In addition, the following departmental requirements hold:

a) ADMISSION: A formal statement about a student's objectives in taking the philosophy program is requested along with his or her application. For admission to regular status, a student must have had at least twenty-four (24) semester credit hours in undergraduate philosophy, or, have equivalent competence. Otherwise, students can apply for conditional or unclassified status.

b) COURSEWORK: Students pursuing the M.A. degree in Philosophy need a minimum of thirty (30) semester hours of satisfactory graduate work. Six of these may be given for a satisfactory thesis in case the thesis option is chosen.

c) READING EXAMS: Students pursuing the M.A. degree in Philosophy must pass oral exams in the history of philosophy on ancient, medieval, and modern philosophy respectively. Each of these three oral exams tests the student on his or her familiarity with and understanding of primary philosophical sources representative of those periods in the history of Western philosophy. Reading lists are available in the department office. Students are encouraged to take these exams early in their programs of study. Each exam is offered once each semester. Retakes are permitted.

d) APPLICATION FOR CANDIDACY: Each student formally applies for candidacy for the M.A. degree in Philosophy only after he or she has:

1. passed the three reading exams;
2. completed eighteen (18) semester hours of graduate work; and
3. obtained official approval of a thesis project, if one is chosen.

Options for the M.A. in Philosophy:

Students working toward the Master of Arts degree in Philosophy are subject to the general graduate policies and options of the University and the College of Arts and Sciences. In addition, the following departmental options are available:

a) *Thesis:* Students wishing to engage in a research thesis are to consult the chairman, academic advisor, and prospective thesis advisors and readers so that suitable appointments can be made. Afterwards, the student is to:

1. submit in triplicate an outline of a thesis project prepared according to the departmental format available in the chairman's office no later than two (2) months before the end of the term immediately prior to the tentative graduation date;
2. submit three copies of the thesis for review by the first Monday of November for graduation in the Fall term, by the first Monday of March for graduation

in the Spring term and by the first Monday in June for graduation in the Summer term;

3. revise, if necessary, the thesis in light of the suggestions of the thesis readers and advisors;
4. submit three final copies of the corrected thesis no later than the first Monday of December for the graduation in the Fall term, the first Monday of April for graduation in the Spring term, and the first Monday in July for graduation in the Summer term;
5. successfully defend the thesis orally after all other requirements are fulfilled.

b) *Language Exam:* Students wishing to continue their philosophic studies are strongly urged to learn at least one or two foreign languages to improve their professional skills in philosophy. Language examinations may be arranged through the chairman of the philosophy department, and, if successfully passed, the results will be noted in the student's official records. But no graduate credit is awarded for passing a language exam.

Teaching Internship for Graduate Assistants in Philosophy:

As part of their contractual obligation, graduate assistants participate in the Teaching Internship Program in Philosophy (Phl. 598). This involves participation in seminars on the teaching of philosophy at the undergraduate level and in the supervised teaching of the lower level course in philosophy, Introduction to Philosophy (Phl. 103). This program is open only to graduate philosophy assistants. It is offered each term for one (1) academic credit upon satisfactory completion of the internship in a given term. Satisfactory completion of this internship will be shown on the transcript and the grade "K" (credit) will be recorded. The grade "K" does not affect the Q.P.A. Receipt of academic credits for this Teaching Internship Program in Philosophy *does not* reduce the (30) semester credit hours requirement for the M.A. degree in Philosophy. A graduate assistant signs up each semester for this course.

Courses of Instruction:

A distinctive feature of the graduate program in philosophy is the emphasis on the continuity of philosophic inquiry from the ancient and medieval era to the modern period. Each philosophy graduate student initially arranges his program in consultation with the chairman of the philosophy department and thereafter in consultation with his or her assigned academic advisor. A program of study developed in terms of student objectives normally calls for exposure to areas beyond those of immediate interest to a student. The following courses or course types are regularly offered by the department and shows a balance between the history of philosophy and contemporary philosophy.

History of Philosophy:

Ancient

Phl 541 Philosophy of Plato
Phl 542 Philosophy of Aristotle
Phl 543 The Presocratic Philosophers

Medieval

Phl 520 Philosophy of Augustine
Phl 525 Philosophy of Aquinas
Phl 540 Medieval Studies

Modern

Phl 545 Modern French Philosophy
Phl 553 Philosophy of Kant
Phl 555 Modern German Philosophy
Phl 556 Philosophy of Hegel
Phl 560 Modern British Philosophy
Phl 563 Philosophy of C. S. Peirce

Contemporary Philosophy:

Phl 510 Philosophy of Science
Phl 550 Philosophy of History
Phl 565 American Pragmatism
Phl 570 Existentialism
Phl 571 Perception and Knowledge
Phl 575 Contemporary Philosophies of Evolution
Phl 576 Contemporary Problems in the Philosophy of God
Phl 577 Recent Christian Thought
Phl 580 Philosophy of Bertrand Russell
Phl 585 Phenomenology
Phl 592 Philosophy of Ordinary Language
Phl 594 Symbolic Logic

Special Course Types:

Phl 590 Directed Studies
Phl 591 Seminar
Phl 598 Teaching Internship in Philosophy
Phl 599 Thesis

GRADUATE PROGRAM IN PHYSICS

Statement of Purpose:

Basically the Master's program in the Department of Physics serves the stated purpose of the University by giving the student a thorough understanding and appreciation of his chosen discipline. Advanced study in physics may be used in several immediate ways:

a. To prepare for an advanced degree (Ph.D.) program;
b. To qualify the student for research and development careers in industry and government;
c. To enrich the backgrounds of teachers of physics on the secondary school level.

Specific Requirements of the Department:

a. Undergraduate requirements: An applicant will be admitted to advanced study in physics if the graduate admission committee of the Department determines he is qualified to take the degree program. In general, a properly prepared student should have the following background:

1. Physics courses which are approximately the equivalent of University of Dayton courses.

   Phy 303 Intermediate Mechanics
   Phy 408 Intermediate Electricity & Magnetism
   Phy 301 Thermodynamics
   Phy 390 Introduction to Quantum Mechanics
   Phy 420 Solid State or
   Phy 421 Nuclear Physics

2. Mathematics through Differential Equations and preferably Advanced Calculus.

   The applicant will be required to make up any deficiencies which the Department deems necessary to bring him to the level of the graduate course.

3. Students are expected to be sufficiently familiar with computer programming to solve basic problems in Physics using the computer by the end of the first term. This requirement can be fulfilled on an ad hoc basis or by taking a formal programming course, for example CPS 144 Fortran Programming.

b. Specific requirements for the degree: The formal requirements for the degree are thirty credit hours of course work properly distributed. 18 of the hours must be graduate physics courses.

1. The "core sequence" required of all degree students.

Phy 511	Classical Mechanics	three credit hours
Phy 515	Statistical Mechanics	three credit hours
Phy 523	Electromagnetic Theory I	three credit hours
Phy 525	Quantum Mechanics I	three credit hours

2. Areas of concentration include

   Optical Spectroscopy & Lasers
   Magnetic Properties of Materials
   Environmental Physics (Nuclear applications)
   Nuclear Spectroscopy
   Polymer Science
   Solid State Theoretical
   Elementary Particle Physics

3. Courses in related disciplines.

   These may be chosen in related fields, mathematics, chemistry, etc. up to a maximum of twelve credit hours with the approval of the Chairman of the Department.

4. Advanced undergraduate courses.
   A maximum of six credit hours of graduate credit may be granted for advanced undergraduate courses which are approved by the Graduate Committee of the Department.
   NOTE: Courses for which undergraduate credit has been allowed may not be repeated for graduate credit.
5. Thesis credit.
   A Master's degree thesis is recommended for those students who have no comparable experience. An oral examination before a committe designated by the Chairman of the Department must be passed before credit can be given. A maximum of six credit hours towards a degree can be given for thesis work.
6. Diagnostic examinations.
   A series of six examinations covering basic physics subjects on the Intermediate Level are provided for candidates entering the program. These exams assist the student and the department to properly place him in appropriate courses.
   No foreign language requirement is necessary for the Master of Science in Physics.

GRADUATE PROGRAMS IN POLITICAL SCIENCE

Statement of Purpose:

The Department of Political Science offers two graduate programs; each one is designed to accomplish a particular objective.

1. The Master of Arts in Political Science is an academic degree which is designed to prepare the student for further graduate work at the Ph.D. level, for teaching or research.
2. The Master of Public Administration is a professional degree which is designed to prepare students for further graduate work or administrative work in a public or private organization.

Requirements for Admission:

1. M.A. in Political Science
   a. Baccalaureate degree
   b. Cumulative average of 2.5 in a 4.0 grading system
   c. Fifteen hours of social sciences with a cumulative average of 2.75
   d. Students coming from colleges and universities operating on a Pass-Fail grading system are required to submit GRE scores taken in the field of political science. Other students are encouraged to present GRE scores for additional evidence of their competence to do graduate work.
2. Master of Public Administration
   a. Baccalaureate degree
   b. Cumulative average of 2.5 in a 4.0 grading system

c. Students coming from colleges and universities operating on a Pass-Fail grading system are required to submit GRE scores taken in the field of political science. Other students are encouraged to present GRE scores for additional evidence of their competence to do graduate work.

Degree Requirements for the M.A. in Political Science:

1. Options are available to students in pursuing this degree and is to be selected after consultation with the student's advisor and in accordance with his long-range academic objective.
   a. Option 1 - Thirty hours consisting of 24 hours of course work, six hours for thesis work, and a comprehensive examination covering the student's course work and the methodology and content of the thesis.
   b. Option 2 - Thirty hours of course work and a comprehensive examination covering the student's course work.

   Students must maintain a B average in all his courses. A reading list covering some major works in the discipline of political science will also be covered in the comprehensive examination.
2. Course Requirements:
   a. Required Courses:
      1. Pol 501 - Scope and Methods of Political Science
      2. Pol 514 or 569 - Political Theory
         The latter course may be taken if the student has already the equivalent of Pol 514 as an undergraduate or at another graduate school.
   b. Elective Courses: A minimum of one course from each of the following areas excluding the required courses.
      1. American Politics and Institutions:
         Pol 508 American Foreign Policy
         Pol 510 Public Administration
         Pol 521 Intergovernmental Relations
         Pol 545 Seminar: Urban Politics
         Pol 557 Seminar: State Governments and Politics
         Pol 574 Seminar: American Politics
         Pol 579 Selected Topics in Public Policy
      2. Political Theory and Public Law:
         Pol 560 American Pol. Thought
         Pol 567 Studies in Political Science
         Pol 569 Seminar: Political Theory
         Pol 571 Constitutional Law
         Pol 572 Administrative Law
         Pol 573 Civil Liberties
      3. International Relations:
         Pol 530 Seminar: International Law
         Pol 589 Seminar: International Relations

4. Comparative Politics:

   Pol 520 Seminar: Politics of Developing Nations
   Pol 524-529 Seminar: Comparative Politics
   Pol 582 Comparative Public Administration
   Pol 584 Comparative Foreign Policy

The remainder of the student's course work must be chosen from the Graduate course offerings of the Department of Political Science in consultation with the student's advisor or the Department Chairman.

c. Cognate Courses: Students may take a maximum of six hours of course work in other social science fields with the approval of his advisor or the Department Chairman.

Degree Requirements for the Master of Public Administration:

1. Options are available to students in pursuing this degree and is to be selected after consultation with the Director of the M.P.A. Program and in accordance with his long-range professional objective.
   a. Option 1 - Thirty hours consisting of 24 hours of course work, six hours of government internship, and a comprehensive examination covering the student's course work and internship experience. The internship requirement may be waived in part or entirely depending upon the length and nature of the student's administrative experience. The internship requirement, when waived, must be replaced by equivalent credits in course work.
   b. Option 2 - Thirty hours consisting of 27 hours of course work, three hours for research paper taken in conjunction with Pol 578, and a comprehensive examination covering the student's course work and the methodology and content of the research paper.

   Students must maintain a B average in all his courses. A reading list covering some major works in public administration will also be covered in the comprehensive examination.

2. Course Requirements:
   a. Required Courses:
      1. Pol 510 Public Administration
      2. Pol 581 Organization Theory
   b. Elective Courses: The student may elect the remainder of his course work from the following graduate courses in the Political Science Department in consultation with his advisor or the Director of the M.P.A. Program.

      Pol 508 American Foreign Policy
      Pol 514 History of Political Theory
      Pol 521 Intergovernmental Relations
      Pol 535 Fiscal Administration
      Pol 540 Problems in Public Administration
      Pol 545 Seminar: Urban Politics
      Pol 552 Government Planning

Pol 557 Seminar: State Governments and Politics
Pol 560 American Political Thought
Pol 571 Constitutional Law
Pol 572 Administrative Law
Pol 573 Civil Liberties
Pol 574 Seminar: American Politics
Pol 576 Public Personnel Administration
Pol 578 Studies in Public Administration
Pol 579 Selected Topics in Public Policy
Pol 582 Comparative Public Administration

c. Cognate Courses: A student may, with the consent of his advisor or the Director of the M.P.A. Program, elect a maximum of two courses offered in the Schools of Business Administration, Education, or Engineering, provided they relate to his professional or career interests.

GRADUATE PROGRAMS IN PSYCHOLOGY

Statement of Purpose:

The Department of Psychology offers five graduate programs.

The Master of Arts program in Clinical Psychology is designed to provide the student with a solid background in the basic areas of clinical psychology through integrating theory, research, and applied experience related to specific courses. The objectives of the program are basic competence in assessment skills and therapy techniques for the individual planning to function at the masters level, plus a broad academic background and knowledge of research methodology for the student planning further graduate work at the doctoral level.

The Developmental Psychology Program affords the Masters level student intensive preparation for advanced work leading to a profession in teaching and research. The program of work involves a core curriculum which has been designed to (1) provide a study of human development from a natural science perspective, and (2) cultivate competence in Developmental research. (The candidate will ordinarily participate in ongoing research during the second semester of residence followed by independent research culminating in a thesis during the second year.)

The Master of Arts program in Experimental/Cognitive Psychology prepares the student for duties as a research psychologist in government, industry, and the university. The program objective is to develop a firm understanding of human cognitive processes from an experimental perspective. The program requires competence in research methodology, quantification and theory. The laboratory and course work is preparatory to advanced study at the Ph.D. level.

The Master of Arts degree in General Psychology is designed to allow the student to pursue an individualized course of study. The student, upon entering the program, will submit a sequence of courses to the advisor which, upon approval, will be considered as the student's course of study. The course sequence will reflect both the student's individual interests as well as the resources available within the Department of Psychology and the university community. Programs including

courses from outside the Department of Psychology are permitted. It is intended that the course sequence will allow the student to pursue further work at the Ph.D. level.

The Master of Arts program in Social Psychology is designed to provide the student with a firm background in theoretical and experimental approaches to social processes. While the emphasis is on laboratory research, students have the opportunity and are encouraged to do field work in practical applications of social psychology to community problems. The course work and research experience are intended to enable the student to undertake further graduate study at the Ph.D. level.

Student Guidance

The student enrolled in the graduate program of the department is provided with the *Student's Guide to Graduate Study in the Department of Psychology*. The Guide provides specific elaboration of the procedures to be followed by the student in completing his graduate studies.

Minimum Entrance Requirements for all Psychology Programs

Undergraduate prerequisites for admission as a regular student:

1. Three credit hours of College Algebra
2. 3.0 point average in Psychology
3. As a minimum, 3 credit hours in Experimental Psychology and 3 hours in Statistics, plus 6 hours in upper level Psychology

Student Status

Each student *admitted* to the Graduate Program is placed in either of the following categories as defined.

a. *Regular Standing*
   Student meeting all the entrance requirements of the department.
b. *Conditional standing*
   1. Students in this status are required to complete admission requirements as determined by the department.
   2. Students are considered as *probationary* pending the results of nine to fifteen hours of graduate work.
c. *Unclassified*
   Students enrolled in graduate courses of the department who may not be necessarily working for a degree.

Candidacy

A graduate student becomes eligible for candidacy when in the judgment of his advisor he has adequately demonstrated ability to satisfy the requirements stipulated in the program for which he was accepted. On the student's part, application for candidacy signifies the intention to complete the degree requirements at the University of Dayton.

Time Limit

The program must be completed within seven years after matriculation. (Period of service in the Armed Forces not included.)

Requirements for Master of Arts in Psychology

1. The number of credit hours and required courses as specified by the individual programs.
2. Minimum B average in course work.
3. Extra-course requirement: Attendance at regularly scheduled seminars on selected issues in psychology, and occasional specialized workshops.
4. Thesis: A relevant and creative research problem incorporating an appropriate review of theory and literature, and demonstrating competence in the application of research methodology.

Requirements for Specific Programs

A. Master of Arts in Psychology (Clinical)

1. 47 credit hours as specified below
   a. 42 hours academic coursework, including thesis
   b. 5 required clerkships
2. Required Courses and Clerkships

Research—Quantitative

Psy 501 Advanced Statistics I (3)
Psy 502 Advanced Statistics II (3)

One of the following three research methods courses:

Psy 554 Research in Clinical Psychology (3)
Psy 585 Experimental Social Psychology (3)
Psy 508 Advanced Experimental Psychology (3)
Psy 599 Thesis (3)

Theoretical

Psy 567 Theories of Personality (3)
Psy 568 Theories of Psychotherapy (3)
Psy 569 Theory and Research in Psychopathology (3)

Psychodiagnosis

Psy 542 Clerkship in Interviewing (1)
Psy 515 Assessment of Intelligence (3)
plus Psy 544 Clerkship in Intelligence Testing (1)
Psy 516 Projective Techniques (3)
plus Psy 543 Clerkship in Projective Techniques (1)

Techniques of Therapy

Choose *two* of the following courses plus clerkships:

Psy 571 Individual Psychotherapy: Theory and Practice (3)
plus Psy 546 Clerkship in Individual Psychotherapy (1)
Psy 523 Group Psychotherapy (3)
plus Psy 545 Clerkship in Group Psychotherapy (1)
Psy 572 Behavioral Therapy: Theory and Techniques (3)
plus Psy 549 Clerkship in Behavior Therapy (1)

Electives

One 3 hour clinical elective

Prescribed Courses in Outside Areas: Two courses to equal 6 credit hours

Developmental

Psy 521 Developmental Psychology

Experimental/Cognitive: Choose one of the following

Psy 522 Advanced Cognitive Processes
Psy 530 Basic Processes in Learning and Memory
Psy 532 Perception
Psy 565 Psychophysiology

Social

Psy 585 Experimental Social Psychology

B. Master of Arts in Psychology (Developmental)

1. 39 credit hours as specified below

Psy 501 Advanced Statistics (3)
Psy 502 Advanced Statistics II (3)
Psy 596 Independent Research (3)
Psy 599 Thesis
Psy 511 Experimental Child Psychology (3)
Psy 512 Perceptual and Attentional Development in Infants and Children (3)
Psy 521 Developmental Psychology (3)
Psy 403 Cognitive Development in Children (3)
Free electives (to equal 6 credit hours) (6)

Prescribed Courses in Outside Areas: Three courses to equal 9 credit hours

Clinical: Choose one of the following

Psy 567 Theories of Personality
Psy 569 Theories and Research in Psychopathology

Experimental/Cognitive: Choose one of the following

Psy 522 Advanced Cognitive Processes
Psy 530 Basic Processes in Learning and Memory
Psy 532 Perception
Psy 565 Psychophysiology

Social

Psy 585 Experimental Social Psychology

C. Master of Arts in Psychology (Experimental/Cognitive)

1. 39 credit hours as specified below

Psy 501 Advanced Statistics I (3)
Psy 502 Advanced Statistics II (3)
Psy 522 Advanced Cognitive Processes (3)
Psy 530 Basic Processes in Learning and Memory (3)
Psy 532 Perception

Psy 565 Psychophysiology (3)
Psy 599 Thesis

Choose 3 of the following: (9)
Psy 508 Advanced Experimental Psychology (3)
Psy 531 Current Theories of Human Learning and Memory (3)
Psy 533 Human Information Processes (3)
Psy 536 Psychology in Perspective (3)
Psy 541 Computer Applications to Behavioral Science (3)
Psy 594 Advanced Quantitative Methods in Psychology (3)
Psy 596 Experimental Research (3)
Psy 597 Readings (3)

Prescribed Courses in Outside Areas: Three courses to equal 9 credit hours

Clinical: Choose one of the following
Psy 567 Theories of Personality
Psy 569 Theories and Research in Psychopathology

Developmental
Psy 521 Developmental Psychology

Social
Psy 585 Experimental Social Psychology

D. Master of Arts in Psychology (General)

1. 39 credit hours as specified below

Psy 501 Advanced Statistics I (3)
Psy 502 Advanced Statistics II (3)
Psy 599 Thesis (3)
Required sources and electives as specified by student's advisor (21)

Prescribed Courses in Outside Areas: Three courses to equal 9 credit hours

Clinical: Choose one of the following
Psy 567 Theories of Personality
Psy 569 Theories and Research in Psychopathology

Developmental
Psy 521 Developmental Psychology

Experimental/Cognitive: Choose one of the following
Psy 522 Advanced Cognitive Processes
Psy 530 Basic Processes in Learning and Memory
Psy 532 Perception
Psy 565 Psychophysiology

Social
Psy 585 Experimental Social Psychology

E. Master of Arts in Psychology (Social)

1. 39 credit hours as specified below

Psy 501 Advanced Statistics I (3)
Psy 502 Advanced Statistics II (3)

Psy 585 Experimental Social Psychology (3)
Psy 596 Independent Research (3)
Psy 599 Thesis (3)

Choose three out of the following four: (9)
Psy 586 Social Psychology Applied to Community Problems (3)
Psy 587 Social Influence and Group Dynamics (3)
Psy 588 Interpersonal Processes (3)
Psy 589 Attitudes (3)

Electives—two courses to equal 6 hours (6)

Prescribed Courses in Outside Areas: Three courses to equal 9 credit hours

Clinical: Choose one of the following
Psy 567 Theories of Personality
Psy 569 Theories and Research in Psychopathology

Developmental
Psy 521 Developmental Psychology

Experimental/Cognitive: Choose one of the following
Psy 522 Advanced Cognitive Processes
Psy 530 Basic Processes in Learning and Memory
Psy 532 Perception
Psy 565 Psychophysiology

GRADUATE PROGRAMS IN THEOLOGICAL STUDIES

Statement of Purpose:

The Graduate Department of Theological Studies is an ecumenical community of students and professors engaged in the study, research, and interpretation of religious issues. It considers these issues from the context of the more classical disciplines of the Judaeo-Christian traditions, as well as the burgeoning areas of multi-cultural and cross-disciplinary concerns. It offers a Master of Arts degree individualized to meet each student's need, whether it be for vocational or advanced degree preparation.

The M.A. program in Theological Studies is conceived as a broad comprehensive approach to the study of Religion and Theology. Its major concern is to develop in the degree candidate a methodology whereby he may approach the field with five major concerns: a solid grasp of Sacred Scripture, the historical development of western theological thought, the comparative study of world religious phenomena, an ecumenical awareness, the establishment of an interdisciplinary mentality. Unique facilities are afforded by the Marian Library which has an exceptional collection of rare books offering the opportunity for original research.

The M.A. program in Pastoral Catechetics is designed to offer students an opportunity to specialize in catechetics while at the same time offering the student a strong concentration in theology. The program is intended to prepare students to serve as teachers of catechetics and religious education, parish coordinators of catechetical programs, and administrators and teachers in adult education programs.

The programs leading to each degree may be pursued in Summer Sessions or full-time, i.e., throughout the year. They must be completed within seven calendar years from the time of matriculation. Another program in Theological Studies is offered conjointly by the University of Dayton and St. Leonard College. Details of this program along with the descriptions of the courses offered at St. Leonard can be found in the catalog of St. Leonard College, Centerville, Ohio.

The University is an active member of the Consortium for Higher Education Religion Studies (CHERS) and of the All-Ohio and Dayton Cluster of Seminaries. This makes possible dialogue with students of other institutions, interchange of facilities, sharing of library resources, and cooperative innovative programming. Through cross-registration, it makes available to the students the courses at the member institutions and thus provides the opportunity for even more flexible construction of their degree programs.

Specific Requirements of the Department:

a. Undergraduate prerequisites: An applicant is admitted to graduate study if the admitting committee of the Department is satisfied that the applicant is fully qualified to undertake graduate study. A minimum of 24 credit hours in philosophy and theology is recommended. Graduate Record Examination score are recommended as a part of the applicant's materials. Upon entrance to the program each student will be interviewed by a committee of the graduate faculty in order to assist him in the development of his program.

b. Specific course requirements for the degree: The candidate must take 36 hours of course work or 30 hours of course work and 6 hours of thesis credit.

The M.A. program in Theological Studies may be pursued in either of the following ways:

1. Specialization program (6-2-2-2): A minimum of six courses must be taken in one area (Biblical Studies, either Old or New Testament, Historical Theology, or Systematic Theology). A minimum of two courses must be taken in each of the other two areas. The remaining two courses may be taken with approval in any area or interdisciplinary subject.

2. Comprehensive program (3-3-3-3): A minimum of three courses must be taken in each of the areas. The remaining three courses may be taken with approval in any area or interdisciplinary subject.

The M.A. program in Pastoral Catechetics consists of seven courses elected in theology and five courses in pastoral catechetics. In theology one course is to be elected in each of the following areas: biblical, historical, moral, and systematic; the other three courses may be elected from any of these areas. In pastoral catechetics two courses, Thl 581, Theology of Revelation, and Thl 582, Religious Education in Context, are strongly recommended of all students; the other courses are to be elected from the catechetics offering, or with approval, from the offerings of other departments. The catechetics offerings will be supplemented by workshops and/or seminars each semester on a particular catechetical problem.

c. In order to permit flexibility to meet the needs and interests of individual

students variations in the programming may be submitted for approval to the director of the graduate program and the student's advisory committee.

d. Language requirement: For both programs a working knowledge of a modern language is recommended. For specialization in the biblical or historical areas a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, may be required.

e. Comprehensive examination: At the completion of his program of studies the degree candidate must manifest his theological competency. This will usually be done by the written and oral presentation of a theological position on a topic chosen by the student and approved by his advisor and the graduate committee. If the student prefers, he may take a written and oral examination instead of the foregoing.

f. Thesis: Students desiring to do so may, with approval, write a thesis for six credit hours of work. They would then be required to do thirty credit hours of course work. An oral defense of the thesis will be required.

V
School of Business Administration

AIMS AND OBJECTIVES

Graduate Work in Business at the University of Dayton

In the fall term of 1963, the Master of Business Administration program at the University of Dayton was launched. The decision to embark upon graduate education in business resulted from several years of careful study and planning. It was determined that such an undertaking afforded the University an opportunity to meet a growing need in an area in which it was in a position to offer a program consistent with the University's objectives of purpose and quality.

Philosophy of the Master of Business Administration Program

The M.B.A. program is designed to provide advanced work on a professional level for those whose occupational and personal objectives can be thus served. The University recognizes that a society characterized by heavy industrialization and organized activity requires an increasing input of skilled managers and administrators. It also recognizes that the increased complexities of enterprise and organization places demands upon managers and administrators that require more exacting mastery of the business disciplines.

The M.B.A. program is predicated on the view that managing is a professional activity. Effective performance in a managerial capacity more and more demands application of a combination of conceptual, behavioral, and technical skills ("technical" referring essentially to the particular methods and processes of accounting, marketing, operations systems, decisions methods, etc.). The base for developing these skills is the mastery of the essentials of certain related disciplines. At the same time, professionalism in the art and science of management must not ignore the vital ingredients of entrepreneurship and creative leadership. These qualities require the ability to integrate, to synthesize, and to apply balanced judgment.

While the value of a degree of specialization is recognized and made available in the M.B.A. program, the emphasis is upon solid grounding in several fundamental disciplines. This is achieved through the concept of "core courses" required of all students. This set of core courses is designed to provide a grasp of and insight into each segment of the "total system". The inter-relationships are emphasized by means of such emphasis in each core course as well as certain courses which specifically are designed to facilitate integration.

The basic objective of the M.B.A. program is to enable the student to develop and apply, in an integrative manner, the conceptual, behavioral, and technical skills necessary for effective and creative management.

The basic objective is accomplished, more specifically, through developing knowledge and skill in the following areas:

1. Management Analysis and Decision Methods
2. Management Functional and Information Systems
3. Management Organizational Processes
4. Management and the Environment
5. Management Integration.

ADMISSION

The program is designed for holders of a bachelor's degree from an accredited college or university. The degree may be in business administration or any field other than business administration. Those whose degrees are in fields other than business administration normally find it necessary to take Graduate Survey courses in the areas of accounting, economics, statistics, management and marketing in addition to the regular 30 hours of graduate courses required for the degree. Those with business administration degrees normally do not need the Graduate Survey courses. In either case, Graduate Survey course requirements are determined on the basis of course deficiency in these five areas in the undergraduate program.

Applicants for admission to the M.B.A. program should demonstrate a readiness for graduate study, personal integrity, and aptitude for successful managerial performance. The Admissions Committee carefully evaluates the following:

1. Undergraduate and other collegiate record as indicated by official transcripts of all universities and colleges previously attended by the applicants.
2. Results of the Admission Test for Graduate Study in Business (ATGSB).
3. A review of work experience and other experiences which may be indicative of success in the program.

In reviewing these factors, the Admissions Committee will take into account matters that will aid in the evaluation. For example, in cases of an undergraduate record that is below the required cumulative point average, the committee will give consideration to the trend of grades.

All applicants are required to take the Admission Test for Graduate Study in Business (ATGSB). The results must be submitted, along with application and transcripts, before the beginning of course work, since it is one of the criteria for admission. Applications for the test are available from the Office of Graduate Studies and must be completed and forwarded to the Educational Testing Service, Princeton, New Jersey, thirty days before the examination date.

Admission with Advanced Standing

A maximum of six hours of appropriate graduate courses earned at another approved graduate school of business may be applied toward the M.B.A. degree at the University of Dayton. No graduate credit earned at either the University of Dayton or another school may be applied to the M.B.A. degree if such course work was completed more than five years prior to the date of graduation.

THE REQUIRED PROGRAM OF STUDIES

MBA courses are grouped under three categories: Group I—Pre-requisite Survey Courses; Group II—Core Courses; Group III—Elective Courses.

Before taking Core and Elective Courses, the student should have acquired a basic knowledge in five business areas: Accounting, Economics, Marketing, Management, and Statistics. This requirement is generally satisfied by the appropriate courses in the student's undergraduate program. Students with an undergraduate degree in business administration normally have met all the pre-requisite requirements and may proceed immediately with Group II and III courses—Core and Elective courses.

NUMBER OF HOURS REQUIRED

Thirty hours of Core and Elective courses are required for the MBA degree. Where Pre-requisite Survey Courses are required because of deficiency in one or more of the five areas specified above, the total number of hours required will be accordingly greater. All MBA courses are three-hour courses, with the exception of one Elective, MBA 595—Individual Research, which may vary from one to six hours. All graduate courses, exclusive of Pre-requisite Surveys, must be completed within five calendar years.

Group I. Pre-requisite Survey Courses

A deficiency in any one of the five areas indicated above necessitates taking the appropriate Graduate Survey Course for that area. The Graduate Survey Courses are as follows:

MBA 500-A Graduate Survey in Economics
MBA 500-B Graduate Survey in Accounting
MBA 500-C Graduate Survey in Marketing
MBA 500-D Graduate Survey in Management
MBA 500-E Graduate Survey in Statistics

Wherever a student's undergraduate program is deficient in the Pre-requisite Courses, he may satisfy this requirement by passing a proficiency test in that area. A sufficient score on the proficiency test will waive the Pre-requisite requirement in that area. Attempting to meet Pre-requisite requirements through proficiency tests is normally advisable when the student has had some course work in areas related to the five pre-requisite courses, but not sufficiently equivalent to warrant acceptance of those courses as fulfilling the Pre-requisite requirement.

Whenever Pre-requisite Survey Courses are required, they must be completed before proceeding to Core Courses. However, a student may take Core Courses during the term in which he is completing his last required Pre-requisite Survey. For example, if the student has only the Graduate Survey in Accounting to take, and he wished to carry a six hour load, he may take one of the Core Courses (except the Accounting Core Courses, MBA 501) simultaneously with the last remaining Survey Course.

Graduate Survey Courses carry graduate credit. Grades received for the Survey courses are computed in the student's Cumulative Point Average for the MBA degree.

Group II. Core Courses

The Core Course plan entails 21 hours of courses, prescribed as follows:

A. *Five* of the following *six*:

MBA 501 Managerial Accounting
MBA 510 Quantitative Methods for Business Decisions *OR*
MBA 511 Application of Management Science in Business
MBA 520 Financial Policies of Enterprise
MBA 530 Marketing Management
MBA 540 Managerial Economics
MBA 560 Operations Management

Note that either MBA 510 or MBA 511 may be selected for the Core Course in the quantitative area. MBA 510 should be selected by those whose quantitative background includes only statistics. MBA 511 should be selected by those whose quantitative background includes, in addition to statistics, some calculus—differentiation and integration. Students should consult with their advisors to determine the appropriate quantitative course for them. Also, students with a heavy background in Accounting (normally a major or very strong minor in the undergraduate program) may be permitted to use an MBA Accounting elective course in lieu of MBA 501 to satisfy the Core requirement in that area.

B. *One* of the following *two*:

MBA 550 Government and Business
MBA 570 Business and Society

C. Required: MBA 590 Business Policies and Administrative Management

This course may be taken only after the student has completed twenty-one hours of graduate courses, exclusive of Pre-requisite Surveys. This course assumes the completion of most of the Core Course requirements.

Group III. Elective Courses

Three elective courses are required. The student may choose electives from among all other MBA courses. He may also use extra core courses as electives. For example, the student may take both MBA 550 and MBA 570 and count one as an elective. There are courses in the School of Business Administration that may be taken for either undergraduate or graduate credit which are available as electives. These courses normally are specialized courses that serve to expand the choice of electives, particularly for those wishing to develop concentration in a particular area. With the permission of the Director of the MBA Program, students may select electives from other Colleges and Schools of the University.

Students are encouraged to select courses outside the School of Business Administration when such is appropriate to their career plans.

Course Sequence

The student should note the following requirements regarding sequence:

Pre-requisite Survey courses must be completed before proceeding to Core and

Elective courses, with the exception of combining Core courses with a last remaining Pre-requisite Survey course as explained above.

MBA 501—Managerial Accounting should be taken before MBA 520—Financial Enterprise.

MBA 510—Quantitative Methods for Business Decisions *or* MBA 511—Application of Management Science in Business should be taken before MBA 540—Managerial Economics. This sequence requirement may be waived where the student's undergraduate quantitative background is strong.

MBA 590—Business Policies and Administrative Management may be taken only after the completion of twenty-one hours of Core and Elective Courses. The twenty-one hours should include at least twelve hours of the courses under Group II-A.

These are the only sequence requirements. The student thus has considerable flexibility in the order in which courses are taken.

COMPREHENSIVE EXAMINATION

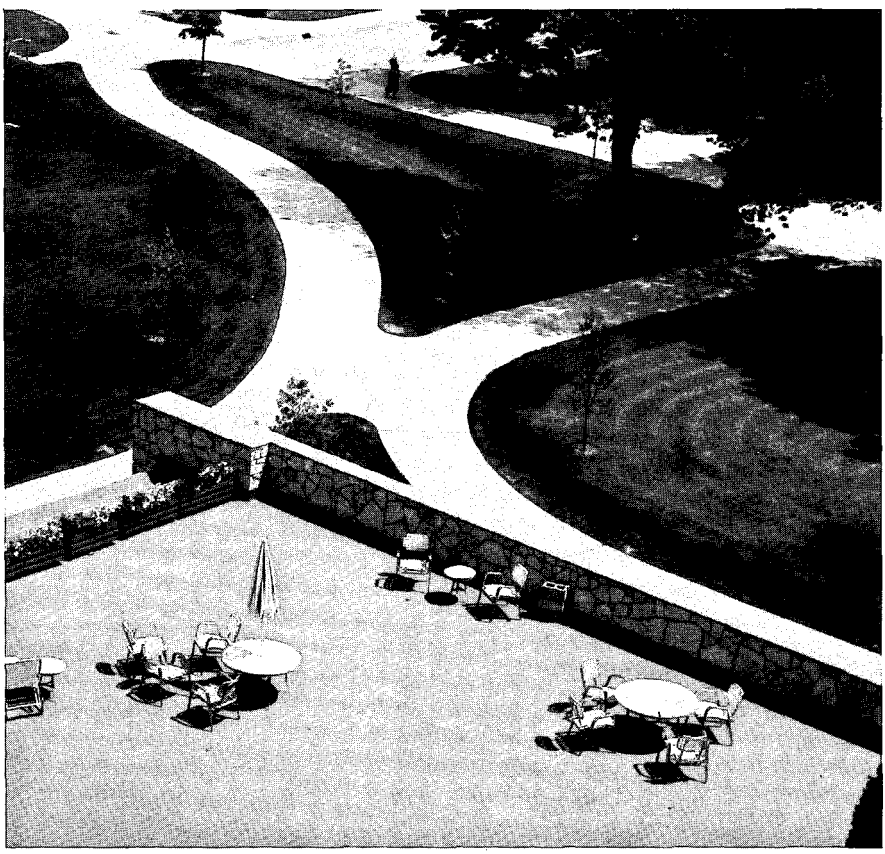
Successful completion of a comprehensive examination is required for graduation. The examination covers basically the Core Course areas. At the time of the publication of this catalog, the required areas on the comprehensive examination include the following: Managerial Accounting, Managerial Economics, Finance, Marketing Management and Management. In each area, the scope of the examination corresponds generally with the content of the Core Courses.

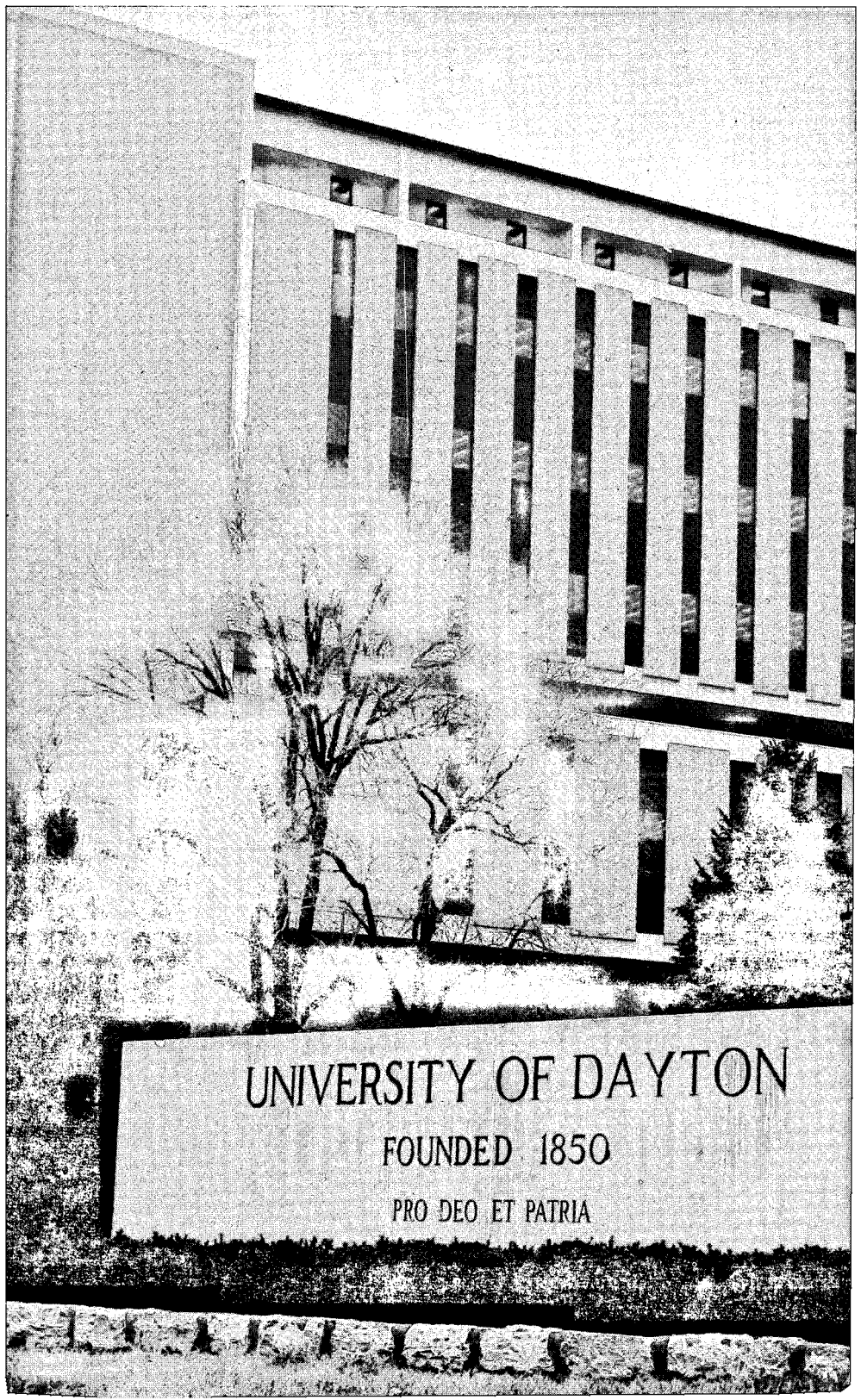
The comprehensive examination is given once during each of the three regular terms. The comprehensive is normally taken during the student's last term of course work. The student may, however, take the comprehensive during the term following his last term of course work.

To be eligible to take the comprehensive examination during a particular term, the student must have at least a 3.00 grade average for all graduate courses, including Pre-requisite Survey Courses where required, completed up to the term in which the examination is taken. For example, if the student contemplates taking the exam during the fall term, his cumulative grade average must be at least a 3.00 before the beginning of that term. The student must be completing all his course work during the term in which he plans to take the exam (unless he chooses to take the exam in the term after completion of course work). If the student's grade average is 3.00 or above, BUT BELOW A 3.20, for all work completed by the term preceding the exam term, he may take the comprehensive PROVIDED he is carrying not more than one three-hour course to complete his course requirements. If a student is carrying six hours or more during his final term of course work, he may may take the exam during that term PROVIDED he has a 3.20 average or above for all course work completed by the term preceding.

INDIVIDUAL RESEARCH

The MBA program does not require a thesis. Students who have an interest in doing the kind of intensive research and investigation usually involved in a thesis should note the course, MBA 595—Individual Research. This course may be taken for one to six hours. The course may be repeated in taking the maximum six hours. For example, the student may do one project for three hours credit and a second project on a different topic for another three hours credit. In all cases, the student contemplating taking MBA 595 must have his project approved by the Course Coordinator indicated by the schedule for each term. The Director of the MBA Program normally serves as Course Coordinator for MBA 595. Approval is obtained by first completing a project proposal form available in the MBA office or from MBA faculty members and arranging for a meeting with the course coordinator to discuss the proposed project. Approval for the MBA 595 project must be obtained before registering for the course. It is advisable for the student to obtain approval sometime during the term preceding the term in which he plans to register for the course.




UNIVERSITY OF DAYTON
FOUNDED 1850
PRO DEO ET PATRIA

VI School of Education

AIMS AND OBJECTIVES

The general objectives of the School of Education coincide with the purposes of the University. Accepting the Christian world-view as its distinctive orientation and seeking to foster principles and values consonant with a caring attitude, the School assists in carrying out the four essential tasks of the University: teaching, research, serving as critic of society, and rendering public service.

The particular objective of the School of Education is to develop those special capabilities of the student which enable him to become an effective practitioner in the field of professional education.

The programs leading to the Master of Science in Education degree are designed primarily to meet the following purposes:

1. To develop teachers with advanced proficiency on the elementary and secondary school levels by providing advanced work for those who have completed a recognized baccalaureate teacher education program.
2. To enable teachers with at least three years' successful teaching experience to qualify for certification as principals, supervisors, executive heads, or local superintendents.
3. To prepare qualified school counselors, school psychologists, or counselors for social agencies.
4. To develop personnel for student services in higher education.
5. To prepare educational research specialists.
6. To enable students with nonprofessional baccalaureate degrees and above-average academic records to gain teacher certification on the secondary level.

SPECIAL FINANCIAL AND INSTRUCTIONAL CONSIDERATIONS FOR GRADUATE STUDENTS IN THE SCHOOL OF EDUCATION

The University of Dayton throughout its history has placed the highest priority upon providing programs for students in education professions. Accordingly, special financial and instructional considerations are proffered since the University is the only institution located in the city of Dayton able to offer nationally accredited programs for those in education professions. Since one of the University's principal purposes is rendering public service, prospective graduate students in education residing in

the city of Dayton, in the greater Dayton area, and in the nation as a whole are eligible for the special considerations indicated below.

a. *Financial Considerations.* With the beginning of the second half of the third term, 1974, the tuition for graduate work in the School of Education will be $29.00 per quarter hour.

b. *Instructional Considerations.* With the beginning of the second half of the third term, 1974, the School of Education will adopt the quarter hour credit system within a trimester calendar. The quarter hour credit system within a trimester calendar offers employed professionals an opportunity to begin and to terminate given courses and experiences at times and dates which are congruent with their responsibilities. Students are encouraged to consult program heads and course schedules each term for specific information.

THE MASTER'S PROGRAM IN EDUCATION

Title and Meaning of the Degree:

The title of the Master's degree to which most of the indicated programs lead is the Master of Science in Education. The Master of Science in Teaching degree is also offered.

The awarding of these degrees means that the candidate has completed a program of graduate work designed to give him the following characteristics:

a. Broader knowledge of an advanced nature of the tested psychological and philosophical theories of education.

b. Essential understandings and skills necessary for intelligent consumption of educational research.

c. More extensive knowledge and skill involved in teaching, or in school counseling, or in school administration.

d. Ability to contribute toward the improvement of school conditions and/or professional practice through consumer research.

Authorization:

The University of Dayton's offerings in graduate work leading to the Master of Science in Education degree have the official approval of the State of Ohio Department of Education, of the North Central Association of Colleges and Secondary Schools, and of the National Council for the Accreditation of Teacher Education.

The programs in School Counseling, in School Psychology, in School Administration, and in Educational Research lead to Provisional Certification by the State of Ohio.

The Master Teacher programs may lead to Eight Year Professional or to Permanent Certification depending on the years of successful teaching performed under the previous provisional certificate held.

Admission Requirements:

a. General Requirements: The School of Education accepts those students into

its graduate program who can present undergraduate records which show them capable of meeting the standards of graduate work and of becoming leaders in their respective fields of professional education.

In order to qualify for admission to the graduate programs, applicants (1) must hold a teacher's certificate on a bachelor's degree from an accredited institution (at least State Accreditation), unless specific exceptions are granted by the Dean; and (2) must have attained an undergraduate quality-point average of at least 2.50 out of a possible 4.00. An exception to the latter requirement may be made if the Department in which the applicant seeks enrollment recommends it and if the recommendation is endorsed by the School's Graduate Review Board. If the exception is granted, the applicant will be placed on conditional status, pending the successful completion of approximately fifteen to eighteen graduate quarter hours. All applicants must submit references from qualified professionals in appropriate fields.

An applicant who is not a graduate of the University of Dayton must submit complete official transcripts of all of his previous college studies. These transcripts should be sent directly to the Dean, School of Education, from the degree-granting institution.

Admission to graduate study on regular, special, or conditional status does not imply admission to candidacy for a degree.

b. School Psychologist: Besides meeting the above requirements, an applicant for the School Psychologist Program must receive a favorable recommendation from the Department of Counselor Education and Human Services. In deciding whether or not to make such a recommendation to the Admissions Committee, the staff will take into account the applicant's physical and mental health, his personality adjustment as determined by appropriate tests, and his general character as determined by reference appraisals solicited from former professors and employers.

c. Master of Science in Teaching: This program is restricted to students who (1) hold a non-professional bachelor's degree; (2) have earned the degree within a period of ten years prior to application to the program; (3) have an undergraduate cumulative point average of 2.5 or higher (on a 4.0 scale); (4) desire certification to teach in secondary school; (5) have a major teaching field which can be serviced by graduate courses offered at the University of Dayton. (Students who desire high school certification but cannot meet these requirements may take Program E-9 on the undergraduate level. Cf. Undergraduate Catalog).

Admission to Candidacy for Degree:

A student becomes a candidate for the Master of Science in Education degree if his cumulative point average for graduate work, the Preliminary Plan for his Research Project or the approved plan for his internship experiences, and his reference appraisals are judged to be acceptable by the Graduate Committee of the School of Education.

The most important consideration in the admission of a student to candidacy is the qualitative aspect of his graduate work to date. He must give evidence of being able to meet all the graduation requirements. Applicants who are deemed unqualified at this point will be advised to discontinue their program.

Students should apply for admission to candidacy after the completion of approximately twenty (20) quarter hours of graduate work, including at least two courses in the area of concentration and EDF 503, Research Methodology and Statistics, or EDA 513, Evaluation of Educational and Organizational Systems. Application is made by filing with the Dean the official candidacy form. Applicants should be sure that all the required credentials are in order and that their Preliminary Plan for the Research Project or the approved plan for their internship experiences is ready for evaluation.

Applicants with a concentration in Administration must ordinarily present evidence of at least three years of successful teaching and recommendations to the program from administrators in position to judge their potential for educational leadership.

Students following Plan C in the School Counseling Program should apply for candidacy upon completion of approximately thirty (30) quarter hours. Approval of the plan for the Research Paper is required.

Requirements for the Degree:

a. Cumulative Point Average: Students must achieve an average of at least 3.00 ("B" average) in all work undertaken in order to qualify for graduation.

b. Research Project or Internship Report: At least ten days before graduation the student must submit three acceptable copies of his Research Project and two copies of an abstract of the Project; OR one acceptable copy of a formal report on his internship experiences; OR, in the case of Plan C, one copy of his Research Paper.

c. Departmental Conference: During the final term preceding graduation the student must participate in a formal "Departmental Conference" as arranged by the appropriate Department Chairman.

Advisement:

The student, while pursuing his graduate program, has access to three sources for official advisement:

a. The Office of the Dean of the School of Education serves as an initial advisory source for students regardless of the program they are following.

b. The chairman of the department or coordinator of a given graduate program acts as special advisor to students enrolled in programs under their jurisdiction. They counsel them with regard to their professional objectives, their selection of courses, and the options that are available in their programs. In the case of specialized programs within the Department they may delegate these functions to the program directors. The student is urged to confer with his chairman and/or director in the very first term of his enrollment.

c. The Project or Internship Advisor, chosen by mutual agreement between the student, the department chairman, and the prospective advisor, guides the student to the successful completion of the Research Project or the approved internship experiences.

PROGRAMS OF STUDY

DEPARTMENT OF FOUNDATIONS OF EDUCATION

MASTER OF SCIENCE IN INTERDISCIPLINARY STUDIES

Dr. M. Audrey Bourgeois, Chairman

A graduate student who is interested in investigating the *real* world of education can structure an individual Interdisciplinary Program (Cf. p. 13) with a concentration in Foundations of Education supported by additional courses from other departments to meet the needs and demands of the student's position. A study of the psychological, and/or cultural aspects of education offers a challenge to the serious student and at the same time provides a firm basis for doctoral work.

Available Courses:

EDF 501	Advanced Psychology of Learning	four quarter hours
EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 503	Research Methodology and Statistics	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours
EDF 518	Cultural Foundations: School and the Social Order	four quarter hours
EDF 550	History of Higher Education in the United States	four quarter hours
EDF 590	Educational Research Design	four quarter hours
EDF 593	Interpretation of Statistics and Research	four quarter hours
EDI 554	Independent Study: Cultural Foundations: Historical	four quarter hours
EDI 578	Independent Study: Cultural Foundations: Political	four quarter hours
EDI 579	Independent Study: Cultural Foundations: Comparative Education	four quarter hours
EDI 591	Research Project	four to six quarter hours

MASTER OF SCIENCE IN EDUCATIONAL RESEARCH

Dr. M. Audrey Bourgeois, Chairman

Program:

The objectives of the Educational Research Program include understanding educational research and evaluation, implementing research projects, drawing correct conclusions and making valid inferences from research data. Graduate courses focusing on educational theory, research design, problems in education, research methodology, statistics, computer usage and programming, psychometrics, and school evaluation are offered to meet the objectives. Students also participate in an internship program (up to eighteen quarter credit hours) through which they gain by practical and personal involvement knowledge of the research and evaluation problems in elementary and secondary schools. To provide ultimate benefit the research experiences offered

through the internship will be carefully monitored and evaluated. A Research Project is required of all students.

Eligibility:

Applicants must:

1. Evidence an interest in educational research and evaluation, and demonstrate a level of undergraduate preparation which merits acceptance by the graduate school.
2. Demonstrate an interest in education through a dedication to teaching, work in administration or service areas, or by any other strong commitment to education as a career.
3. Ordinarily possess valid teacher certificate.

Recent graduates with teacher certification and/or individuals who wish to earn the educational administrative specialist certificate with a speciality in educational research are invited to consider this program which in the educational field is gaining recognition and respect.

Value:

The Program provides an excellent basis for doctoral work in research and evaluation and is a practical preparation for positions involved with evaluation in governmental, educational, and other professional areas.

Program Requirements:

EDF 501	Advanced Psychology of Learning	four quarter hours
EDF 502	Advanced Philosophy of Education	four quarter hours
EDA 513	Evaluation of Educational and Organizational Systems	four quarter hours
EDC 533	Psychometrics	three quarter hours
EDF 590	Educational Research Design	four quarter hours
EDF 593	Interpretation of Statistics and Research	four quarter hours
EDF 596-597	Internship in Educational Research	eighteen quarter hours
— —	Elective	four quarter hours

DEPARTMENT OF COUNSELOR EDUCATION AND HUMAN SERVICES

Dr. Eugene K. Moulin, Chairman

Purpose:

The purpose of the Department of Counselor Education and Human Services is to prepare elementary school counselors, secondary school counselors, student service personnel in higher education, school psychologists, visiting teachers, directors of pupil personnel services, guidance supervisors for state, county and local systems, and counselors for community and other agency settings.

Courses in Counseling, Personality and Vocational Theories; Principles and Techniques of Pupil Services; Individual and Group Counseling; Psychometrics;

Individual Personality Evaluation; Educational, Occupational and Social Information; Community Resources; Test Administration and Interpretation; Organization, Administration and Program Development of Pupil and Student Services; Evaluation of Educational and Organizational Systems; and Research Methodology and Statistics are applicable to Departmental emphases. In addition, selected courses in behavioral and social science as well as other related disciplines lead to provisional certification as a School Counselor, Visiting Teacher, and School Psychologist by the various State Departments of Education.

Goal:

The ultimate goal of the graduate program is to develop fully functioning human service specialists qualified and capable of implementing a role consistent with the philosophy reflected in their training. Essentially, this role consists of assisting children, youth and adults from varying socio-economic backgrounds in reaching their maximum academic and personal development in various educational and organizational settings.

Special Factors:

This ultimate goal is met by attending to three sets of activities: (1) those which build skills and develop understandings relative to the role of the various human service specialists in assisting children, youth and adults from varying socio-economic backgrounds; (2) those which develop a method for conceptualizing the settings in which these skills are to be implemented; and (3) those which allow the graduate student to test and develop his capacities for implementing these skills in practicum and internship experiences within new kinds of co-operating school and community agencies.

1. Toward the first end the human service specialists in training are assisted in developing skills in counseling with clients from varying socio-economic backgrounds in individual situations. They learn to conduct group process sessions with different age clients and learn when and how to utilize consultative services within educational and organizational settings, as well as those social services available to children, youth and their parents living in an urban setting. Participants are assisted in developing competencies related to their specific area of specialization. Further, they explore the role of various human service specialists as it relates to the development of school and community climates in which self-fulfillment is a realistic possibility.

Graduate students are assisted in integrating essential understandings out of which these skills and techniques can continue to develop beyond their formal training. These understandings include those associated with the impact of family, poverty, and institutions on child and adolescent development, the nature of the learning process, and the impact of the specific learning setting upon learning efficiency and upon the total development of students from varying socio-economic backgrounds.

Another set of understandings for the human service specialist are those which concern himself as a person and the realization of the potential impact he may have upon students, parents, teachers, administrators and other professionals. Toward this end, there is a continual attempt to provide opportunity for activities designed to

clarify values, increase self awareness and improve interpersonal skills on the part of the graduate student.

2. A second set of activities is directed toward assisting the graduate student to develop skills in examining elementary, middle, secondary schools, community, governmental and other institutional settings and in building models of those settings with particular emphasis upon those factors significantly affecting children, youth, teachers, administrators, human service specialists and other professionals. The personnel, curriculum, student body, and organizational and power structure, dynamics of the learning and living situation and the press of the setting upon the total functioning of children and youth are all aspects for the graduate student to incorporate into his schema. In brief, he formulates perceptions of the complex institutional structure within which he will function as a human service specialist and in which he will utilize his specific skills.

3. Toward the third end, the graduate student is provided the opportunity to test and further refine in an institutional setting his style of implementing skills gained in the course of didactics and specifically planned practica and internship experiences. The unique perceptions and applications of techniques of the graduate student will become the concern of this process. His own style of implementation of his learnings will be the focus of these activities, and through individualized supervision his own system of performing many diverse professional duties will be tested and developed. The result of this phase will be to provide the graduate student a realistic experience in developing his ability to implement his skills in situations he will most likely encounter during his professional career.

Instructional and Laboratory Facilities and Equipment:

Excellent facilities serve the instructional, conference, practicum, and internship needs of the graduate program in human services. The space assigned includes modernly designed instructional classrooms with adjacent group conference rooms, audio-visual rooms, an administration and clerical area, faculty offices, and graduate student facilities.

The facilities of the Department of Counselor Education and Human Services are continually available to serve the observation and supervision practicum needs in counseling and testing. Eight fully equipped one-way vision observation rooms are included. The rooms are equipped with one-way vision mirrors and sound recording instruments with a central console, making possible any desirable listening or recording combination. Audio-visual equipment is also available and is utilized in imaginative approaches in courses, practicum and internship experiences. A Guidance Materials Center, adjacent to the counseling suite, contains educational and occupational information and a specimen set of standardized tests. All of the student service facilities of the University of Dayton, Sinclair Community College, Afro-American Studies Center, Model Cities Educational Center, Montgomery County Joint Vocational School, Vandalia Butler City Schools, Roosevelt High School and numerous other elementary, secondary schools and community and social agencies are available resources for the graduate student.

Faculty:

The faculty has been carefully selected in terms of academic and experiential backgrounds needed to fulfill the goals of the program. The Graduate Program requires the involvement of principal faculty who are experienced human service specialists and support faculty from the University and part-time faculty chosen specifically for their ability to carry out their assigned content to process assignments. Also, the total faculty have had prior experience teaching the courses which comprise the heart of the pre-set instructional program.

In conclusion, the faculty responsible for the various Graduate Programs in the Department are well qualified. They are persons experienced in practice, trained for their respective assignments, published in professional journals, and active in their respective professional associations. They are also persons committed to the development of human services as a profession.

Three Plans for M.S. in Education:

Plan A: 45 quarter hours
Research Project

Plan B: 45 quarter hours
Report, Internship course

Plan C: 54 quarter hours
Paper, Internship course

SCHOOL COUNSELOR

Core Courses:

EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 503	Research Methodology and Statistics (Required Plan A) . . . OR	four quarter hours
EDA 513	Evaluation of Educational and Organizational Systems	four quarter hours

Concentration:

One or more courses from the following seven areas. (Minimum of 36 quarter hours):

1. GUIDANCE

EDC 522	Principles and Techniques of Guidance	three quarter hours
EDC 539	Administration of Pupil Personnel Services	three quarter hours
EDC 580	Guidance in the Elementary School	three quarter hours

2. HUMAN DEVELOPMENT

EDC 530	Psychology of Individual Differences	four quarter hours
EDC 531	Dynamics of Personality	four quarter hours
EDC 532	Learning Disabilities	four quarter hours
EDF 501	Advanced Psychology of Learning	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours

3. INDIVIDUAL AND GROUP APPRAISAL

EDC 533	Psychometrics	three quarter hours

EDC 534 Individual Psychological Evaluation of Exceptional Children ..... three quarter hours
EDC 535 Practicum 1: Test Interpretations and Case Studies ..... three quarter hours

4. COUNSELING

EDC 543 Counseling Theories ..... four quarter hours
EDC 581 Counseling in the Elementary School ..... four quarter hours

5. GROUP METHODS

EDC 583 Group Process ..... four quarter hours

6. GUIDANCE INFORMATION

EDC 524 Educational and Occupational Information ..... three quarter hours
EDC 525 Use of Community Resources ..... three quarter hours
EDC 528 Career Education ..... three quarter hours

7. PRACTICUM

EDC 545 Practicum in Counseling Techniques ..... four quarter hours
Research Project (EDI 591)—Plan A . . . OR ..... four quarter hours
Internship in Pupil Personnel Services (EDC 599)—
Plan B . . . OR ..... four quarter hours
Electives—Plan C
Independent Studies in Pupil Personnel Services (EDC 574) one to six quarter hours

VISITING TEACHER

Core Courses:

EDF 502 Advanced Philosophy of Education ..... four quarter hours
EDF 503 Research Methodology and Statistics . . . OR ..... four quarter hours
EDA 513 Evaluation of Educational and Organizational Systems ..... four quarter hours

Concentration:

One or more courses from the following seven areas. (Minimum of 36 quarter hours):

1. HUMAN GROWTH AND DEVELOPMENT

EDC 531 Dynamics of Personality ..... four quarter hours
EDF 504 Advanced Child and Adolescent Psychology ..... four quarter hours

2. PSYCHOLOGY OF EXCEPTIONAL CHILDREN

EDC 530 Psychology of Individual Differences ..... four quarter hours
EDC 532 Learning Disabilities ..... four quarter hours

3. EDUCATIONAL PSYCHOLOGY

EDF 501 Advanced Psychology of Learning ..... four quarter hours

4. TESTING AND MEASUREMENT

EDC 533 Psychometrics ..... three quarter hours

EDC 534 Individual Psychological Evaluation of Exceptional Children ..... three quarter hours
EDC 535 Practicum 1: Test Interpretations and Case Studies ..... three quarter hours

5. PUPIL PERSONNEL SERVICES

EDC 522 Principles and Techniques of Guidance ..... three quarter hours
EDC 539 Organization and Administration of Pupil Personnel Services ..... three quarter hours

6. COUNSELING PRINCIPLES

EDC543 Counseling Theories ..... four quarter hours
EDC 581 Counseling in the Elementary School ..... four quarter hours

7. OHIO SCHOOL LAW, FAMILY COUNSELING, COMMUNITY ORGANIZATIONS OR JUVENILE DELINQUENCY

EDA 515 School Law ..... four quarter hours
EDF 518 Cultural Foundations: School and the Social Order ..... four quarter hours
EDC 525 Use of Community Resources ..... three quarter hours

Practicum in Counseling Techniques (EDC 545) ..... four quarter hours

Internship in Pupil Personnel Services (EDC 599)—Plan B ..... four quarter hours

Electives—Plan C

Independent Studies in Pupil Personnel Services (EDC 574) one to six quarter hours

COLLEGE SERVICE PERSONNEL

General Requirements:

45 quarter hours
Research study during Internship

Core Courses:

EDF 502 Advanced Philosophy of Education ..... four quarter hours
EDF 503 Research Methodology and Statistics ..... four quarter hours
EDF 504 Advanced Child and Adolescent Psychology ..... four quarter hours

Concentration Courses:

EDC 533 Psychometrics ..... three quarter hours
EDC 543 Counseling Theories ..... four quarter hours
EDC 545 Practicum II: Counseling Techniques ..... four quarter hours
EDC 551 Student Personnel Services in Higher Education ..... three quarter hours
EDC 552 Seminar: College Personnel Service Problems ..... two quarter hours
(The Seminar will be given in one quarter hour blocks over two trimesters).

EDC 553	Internship in College Personnel Services (The Internship is given in three quarter hour blocks over three trimesters).	nine quarter hours
EDC 583	Group Process	four quarter hours
EDF 550	History of Higher Education in the United States	four quarter hours

SOCIAL AGENCIES COUNSELOR

General Requirements:

45 quarter hours
Report, Internship course

Core Courses:

EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 503	Research Methodology and Statistics ....OR	four quarter hours
EDA 513	Evaluation of Educational and Organizational Systems	four quarter hours

Concentration:

EDC 524	Educational and Occupational Information ....OR	three quarter hours
EDC 525	Use of Community Resources	three quarter hours
EDC 543	Counseling Theories	four quarter hours
EDC 545	Practicum in Counseling Techniques	four quarter hours
EDC 599	Internship in Pupil Personnel Services	four quarter hours
EDC 574	Independent Studies in Pupil Personnel Services	four quarter hours
EDC 583	Group Process	four quarter hours

Electives:

EDC 530	Psychology of Individual Differences	four quarter hours
EDC 531	Dynamics of Personality	four quarter hours
EDC 532	Learning Disabilities	four quarter hours
EDC 533	Psychometrics	three quarter hours
EDC 534	Individual Psychological Evaluation of Exceptional Children	three quarter hours
EDC 535	Practicum I: Test Interpretation and Case Studies	three quarter hours
EDF 501	Advanced Psychology of Learning	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours
EDA 515	School Law	four quarter hours
EDF 518	Cultural Foundations: School and the Social Order	four quarter hours

SCHOOL PSYCHOLOGIST

Core Courses:

EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours
EDF 593	Interpretation of Statistics and Research	four quarter hours

Concentration:

EDC 531	Dynamics of Personality	four quarter hours
EDC 532	Learning Disabilities	four quarter hours
EDC 533	Psychometrics	three quarter hours
EDC 534	Individual Psychological Evaluation of Exceptional Children	three quarter hours
EDC 543	Counseling Theories OR	four quarter hours
EDC 581	Counseling in the Elementary School	four quarter hours
EDC 545	Practicum II: Counseling Techniques	four quarter hours
EDC 572	The School Psychologist: Role and Function	three quarter hours
EDC 576	Child and Adolescent Personality Evaluation I	four quarter hours
EDC 577	Child and Adolescent Personality Evaluation II	four quarter hours
EDF 501	Advanced Psychology of Learning	four quarter hours

Internship (EDC 594-595) for those students wanting certification in Ohio ..... sixteen quarter hours

Upon successful completion of the above program the student will be awarded the Master's degree.

For those students who prefer to obtain the Master's degree before the internship, the following courses are required:

EDF 590	Research Design	four quarter hours
EDI 591	Research Project	four quarter hours

Students from outside Ohio are responsible for initiating and completing the internships and certification requirements of their state.

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

MASTER OF SCIENCE IN EDUCATION— EDUCATIONAL ADMINISTRATION

Dr. John R. O'Donnell, Chairman

The Department of Educational Administration offers programs which lead to a Master's degree and/or certification as principals, supervisors, executive heads and local superintendents. Programs are geared to meet the requirements of the State of Ohio and also the needs of individuals who are pursuing the various programs.

All students must complete forty-five (45) quarter hours for the Master's degree and participate in the Departmental Conference. Requirements for the degree include the following offerings:

Core Courses: (12 quarter hours)

EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 501	Advanced Psychology of Learning ....OR	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours
EDF 503	Research Methodology and Statistics ....OR	four quarter hours
EDA 513	Evaluation of Educational and Organizational Systems	four quarter hours

Area Concentration: (23 quarter hours)

EDA 506	School Administration	four quarter hours
EDA 507	Planned Field Experience	four quarter hours
EDA 509	School Supervision	four quarter hours
EDA 511	Elementary School Curriculum	four quarter hours
EDA 512	Secondary School Curriculum	four quarter hours
EDC 522	Principles and Techniques of Guidance	three quarter hours

Electives: (10 quarter hours)

EDA 514	Individual Study in Administration	one to three quarter hours
EDA 515	School Law	four quarter hours
EDA 516	School Plant	four quarter hours
EDA 517	School Finance	four quarter hours
EDA 521	School Public Relations	four quarter hours
EDA 526	Educational Staff Personnel Administration	four quarter hours
EDC 532	Learning Disabilities	four quarter hours
EDC 583	Group Process	four quarter hours
EDA 585	Organizational Systems	four quarter hours
EDI 591	Research Project	four quarter hours

Other electives may be taken in the Departments of Counselor Education and Human Services, Foundations of Education, Elementary Education, Secondary Education, and Physical Education or other departments of the University with the Chairman's permission.

DEPARTMENT OF ELEMENTARY EDUCATION

MASTER OF SCIENCE IN EDUCATION—ELEMENTARY EDUCATION

Dr. Simon J. Chavez, Chairman

The Department of Elementary Education offers a career-oriented program that stresses development and refinement of a repertoire of teaching competencies.

A very special attempt is made to serve as a facilitating agency for each graduate student's professional development. Each applicant for a Master's degree is asked to meet with the Chairman for initial advisement. He will receive individual attention in planning his program, and be encouraged to select courses and course activities that will evolve into a cumulative program that best suits his own perceived needs and

interests. These courses provide opportunities for the student to correlate educational theory with application to his own school situation.

A minimum of forty-five (45) quarter hours is required to fulfill degree requirements. Except for students seeking certification as Reading Supervisors, the following four courses are the only required courses for all students:

1. EDF 501 Advanced Psychology of Learning ..... four quarter hours
OR
EDE 561 Interaction Analysis ..... four quarter hours
2. EDF 502 Advanced Philosophy of Education ..... four quarter hours
3. EDF 503 Research Methodology and Statistics ..... four quarter hours
4. EDI 591 Research Project ..... four quarter hours

Students have available an extensive choice of courses that can be combined into a "package" that has relevance to their own professional situation. Among the types of combinations the student may make are the following:

1. A concentration in Reading leading to certification as Reading Supervisor. In this program the following courses are required:

EDE 566 Innovations in Language Arts ..... four quarter hours
EDE 567 Survey of Research in Reading Instruction ..... four quarter hours
EDE 568 Diagnosis and Correction of Reading Difficulties ..... four quarter hours
EDE 569 Advanced Developmental Reading ..... four quarter hours
EDE 570 Supervision and Curriculum in Reading ..... four quarter hours
EDE 571 Practicum in Reading Diagnosis ..... three quarter hours (concurrent with EDE 568)

2. Elementary Curriculum and Instruction, involving courses in various subjects and curricular areas.

3. Subject-concentration, involving the combination of courses in two or more related areas, such as mathematics and science.

The following list of courses provides the student with a choice of individual courses or combinations:

EDE 500 Mathematics in the Elementary School ..... four quarter hours
EDA 511 Elementary School Curriculum ..... four quarter hours
EDE 557 Library Materials for Children and Adolescents four quarter hours
EDE 559 Research and Materials in Mathematics Instruction ..... four quarter hours
EDE 560 Research in Social Studies Instruction ..... four quarter hours
EDE 561 Interaction Analysis ..... four quarter hours
EDE 562 Educational Media ..... four quarter hours
EDE 563 Supervision of Student Teaching ..... four quarter hours
EDE 564 Advanced Science in Elementary School ..... four quarter hours
EDE 565 Practicum in Science Instruction ..... four quarter hours
EDE 566 Innovations and Trends in Language Arts ..... four quarter hours
EDE 567 Survey of Research in Reading Instruction ..... four quarter hours

EDE 568	Diagnosis and Correction of Reading Difficulties	four quarter hours
EDE 569	Advanced Developmental Reading	four quarter hours
EDE 570	Supervision and Curriculum in Reading	four quarter hours
EDE 558	Independent Study (By arrangement)	one to four quarter hours
EDE 571	Practicum in Reading Diagnosis (concurrent with EDE 568)	three quarter hours
EDI 591	Research Project	four quarter hours

Another possibility are some upper level courses, which may be taken for graduate credit, such as:

EDE 360	Children's Literature	four quarter hours
EDE 390	Learning and Behavioral Disorders	four quarter hours
EDE 451	Advanced Kindergarten Instruction	four quarter hours
EDE 460	Science in the Elementary School	four quarter hours
EDE 480	Psychology and Education of the Retarded	four quarter hours
EDE 489	Educational Practices for Educable Mentally Retarded	four quarter hours
EDE 490	Educational Practices for Educable Mentally Retarded	four quarter hours

In addition to the above courses, the student may choose offerings listed in the Department of Counselor Education and Human Services and in the Department of Foundations of Education with the permission of the Chairman.

DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION

MASTER OF SCIENCE IN EDUCATION—PHYSICAL EDUCATION

Mr. James B. LaVanche, Chairman
Dr. Doris Drees, Coordinator of Graduate Studies

Purpose:

The Master's program in Physical Education is a flexible, personalized program designed to provide to the student advanced training in physical education so as to develop those special capabilities which will enable him to become a competent practitioner and leader in the field of physical education.

Admission Requirements:

1. The student must be a graduate of an accredited four-year college or university.

2. The student must hold a teacher's certificate in physical education.

3. The student must have a grade point average of 2.5 or better out of a possible 4.00 in his undergraduate program. Exceptions to this requirement will be based on recommendations and the endorsement by the School of Education's Graduate Review Board. If the exception is granted, the applicant will be placed on conditional status, pending the successful completion of approximately fifteen to eighteen quarter hours of graduate credit.

Student Guidance:

1. The Coordinator of the Graduate Program within the department will act as the student's academic adviser.

2. A personalized program will be planned with the student during his first term of enrollment in an effort to meet his professional and personal goals and needs.

3. The Coordinator will also counsel the student on the purpose and requirements of graduate work, selection of courses, and the options that are available within the department.

Specific Requirements of the Department:

Admission to Candidacy: A student becomes a candidate for the Master's degree if his cumulative point average for graduate work, the Preliminary Plan for his Research Project (if following Option A), and his reference appraisals are judged to be acceptable by the Graduate Committee of the Department of Physical Education.

The most important consideration in the admission of a student to candidacy is the qualitative aspect of his graduate work to date. He must give evidence of being able to meet all the graduation requirements. Applicants who are deemed unqualified at this point will be advised to discontinue their program.

Students should apply for admission to candidacy after completion of twenty-five quarter hours of graduate work, including at least two courses in the area of physical education and EDF 503, Research Methodology. Application is made by filing the official candidacy form with the Coordinator of the Departmental Graduate Program.

Undergraduate Courses:

1. The following undergraduate courses may be taken for graduate credit:

EDP 405 Tests and Measurements
EDP 407 Current Issues Health Education
EDP 408 Physiology of Exercise
EDP 409 Kinesiology
EDP 410 Adapted Physical Education

2. The maximum number of undergraduate credits that can be taken for graduate credit is six hours.

3. The students may not repeat any courses for which they already have undergraduate credit.

4. Any exceptions to the above must be approved by the departmental graduate committee, the Dean of the School of Education, and the Dean for Graduate Studies.

Comprehensive Examination:

1. Successful completion of a written comprehensive examination is required for graduation.

2. The comprehensive examination will basically cover the student's area of concentration (physical education courses).

3. The examination, three hours in length, is given once during each of the three regular terms.

4. The examination may be taken during the student's last term of course work or after he has completed the course work in the area of concentration.

5. It is the student's responsibility to formally apply one month in advance for the examination. Examination dates will be posted at the beginning of each term.

6. If the student fails the examination the first time, he will be given a second opportunity. Failure the second time incurs failure and the student will be dismissed from the program.

Degree Requirements: (45 quarter hours)

1. Students must achieve an average of at least 3.00 ("B" average) in all work undertaken in order to qualify for graduation.

2. Students must successfully pass the written comprehensive examination.

Core Courses: (12 quarter hours)

EDF 502	Advanced Philosophy of Education	four quarter hours
EDF 503	Research Methodology and Statistics	four quarter hours
EDF 501	Advanced Psychology of Learning ....OR	four quarter hours
EDF 504	Advanced Child and Adolescent Psychology	four quarter hours

Area of Concentration:

Students may choose 18 quarter hours from the following:

EDP 508	Physical Education Workshops	one to four quarter hours
EDP 510	History of Physical Education	three quarter hours
EDP 519	Sport and Society	three quarter hours
EDP 523	Curriculum Development of Physical Education	three quarter hours
EDP 529	Innovative Practices in Physical Education	three quarter hours
EDP 537	Mechanical Analysis of Motor Skills	four quarter hours
EDP 538	The Nature and Basis of Motor Skill Acquisition	three quarter hours
EDP 546	Scientific Principles of Athletic Conditioning	four quarter hours
EDP 547	Administration of Interscholastic and Intramural Athletics	three quarter hours
EDP 548	Human Movement Theories in Physical Education	three quarter hours
EDP 555	Survey of Research in Physical Education	three quarter hours
EDP 556	Issues in Physical Education (Seminar)	three quarter hours
EDP 575	Individual Studies in Physical Education	one to four quarter hours
EDP 582	Internship in Physical Education	one to four quarter hours

Electives: (9 quarter hours)

Courses selected from general, professional, physical, or health education.

Options: (6 quarter hours)

(A) EDI 591 Research Project ....OR .....six quarter hours

(B) Additional course work in physical education .....six quarter hours

Combined Programs:

There is an opportunity to obtain an elementary or secondary principal's certificate with this degree. An opportunity is also available to obtain a supervisor's certificate without additional course work.

DEPARTMENT OF SECONDARY EDUCATION

MASTER OF SCIENCE IN TEACHING (M.S.T.) PROGRAMS for Certificated and Uncertificated Students

Mr. Robert Kriegbaum, Acting Chairman
Dr. Helen Frye, Coordinator of Graduate Studies

The primary purpose of the Master of Science in Teaching (M.S.T.) program is to give teachers of secondary school subjects an opportunity to gain further depth in their teaching fields and to gain in application of pedagogical skills *in practical settings.*

Three options are available to those who wish to pursue the M.S.T. degree.

Option one. Option one is designed for experienced, certificated teachers who desire improvement in the teaching field and who desire to be kept up-to-date in strategies of instruction. Requirements for option one are as follows:

EDS 589 Seminar and Practicum in the Study of Learning Environments .....nine quarter hours

Subjects selected from one or from related teaching fields .....thirty-six quarter hours

Option two. Option two is designed for experienced, certificated teachers who desire greater depth in both teaching fields and the application of instructional strategies. Ordinarily teachers choosing option two seek to prepare themselves for positions of instructional leadership such as department heads, facilitators, etc. Requirements for option two are as follows:

EDF 501 Advanced Psychology of Learning .....four quarter hours
EDF 502 Advanced Philosophy of Education .....four quarter hours
EDF 503 Research Methodology and Statistics .....four quarter hours
EDF 504 Advanced Child and Adolescent Psychology .....four quarter hours
EDS 588 Personal Knowledge .....four quarter hours
EDS 589 Seminar and Practicum in the Study of Learning Environments .....nine quarter hours
Subjects selected from teaching fields or education .....sixteen quarter hours

Option three. Option three is designed for students who have earned the bach-

elor's degree and who desire to become certificated teachers while pursuing post baccalaureate studies. Requirements for option three are as follows:

EDF 501	Advanced Psychology of Learning	four quarter hours
EDF 502	Advanced Philosophy of Education	four quarter hours
EDS 351	The Secondary School, Self, and Society	four quarter hours
— —	Special Methods in Principal Teaching Field	four quarter hours
EDS 589	Seminar and Practicum in the Study of Learning Environments	nine quarter hours
EDS 598	Internship in Teaching	fifteen quarter hours
— —	Subjects in the Principal Teaching Field	five quarter hours*

*(This is the minimum requirement; if the student needs additional work in the teaching field for certification, more requirements in the teaching field may be suggested if one's undergraduate program contains deficiencies).

Graduate level courses in teaching fields are available in the following areas: Biology, Business, Chemistry, Communication Arts, English, History, Mathematics, Physics, Political Science, Social Psychology, and Theological Studies.

The essence of the three M.S.T. options is EDS 589, Seminar and Practicum in the Study of Learning Environments. Emphasis is placed upon developing teaching competencies in practical settings. Students are asked to become proficient in assessing the verbal climate in an educational setting, to be able to elicit certain behaviors from students, and to be able to engage in a kind of self examination which results in personal growth.

VII School of Engineering

FOREWORD

The School of Engineering offers programs leading to Master's, Doctor of Engineering, and Doctor of Philosophy degrees in various areas of Engineering. These graduate engineering programs permit both departmental and interdisciplinary areas of study and are designed to meet both the specialized and continuing educational needs of the engineer. Sufficient flexibility is allowed to permit the student to pursue a broad field of study or to specialize in selected areas.

The School of Engineering currently offers graduate programs leading to the following degrees:

MASTER'S DEGREES

Master of Science in Engineering
Master of Science in Engineering—Aerospace
Master of Science in Engineering—Materials
Master of Science in Chemical Engineering
Master of Science in Civil Engineering
Master of Science in Electrical Engineering
Master of Science in Engineering Management
Master of Mechanical Engineering

DOCTOR'S DEGREES

Doctor of Engineering
- Major in Aerospace Engineering
- Major in Electrical Engineering
- Major in Materials Engineering
- Major in Mechanical Engineering

Doctor of Philosophy in Engineering
- Major in Aerospace Engineering
- Major in Electrical Engineering
- Major in Materials Engineering
- Major in Mechanical Engineering

FIVE-YEAR MASTER'S PROGRAM

Undergraduate students, who have shown above average scholastic performance during their first three years of undergraduate work, are eligible to pursue the Five-Year Master's Program. This program allows the Senior engineering student the opportunity of taking selected graduate courses, making it possible to complete the requirements for a Master's Degree with only two semesters of additional work beyond the Bachelor's Degree. Undergraduate students, who are interested in this program, should contact the Department Chairman during the last semester of their Junior Year.

FINANCIAL AID

Assistantships and industrial fellowships are available at the University of Dayton for the encouragement of graduate work and the promotion of research. These are administered by the academic departments. Detailed information relative to application may be secured from the Director of Engineering Graduate Programs.

MASTER'S DEGREE REGULATIONS

Admission Requirements

To be considered for admission to graduate study in the School of Engineering, a student must have received an undergraduate degree with emphasis in engineering, physics, chemistry, or applied mathematics. The normal qualification for admission to graduate study in the School of Engineering is graduation from an accredited engineering curriculum with above average scholastic performance (2.7 or better cumulative grade point average based on a 4.0 grading system). Those with lower grade point averages will be considered for acceptance on a probationary status, in which case particular attention will be given to the last 60 semester hours of their undergraduate program, recommendations, and engineering experience. Students who have degrees in physics, chemistry, applied mathematics or related sciences are encouraged to apply, but may be required to take a limited amount of undergraduate work in preparation for graduate study in the School of Engineering. The minimum mathematics requirement for admission to graduate study is three semester hours in differential equations.

Unclassified Graduate Status

Students may also be accepted in Unclassified Graduate Status. These individuals will be considered as students of the School of Engineering who have not been admitted in a graduate degree program. A student can only transfer a maximum of two courses taken in this status to a Program of Study for a degree without pre-enrollment approval from the Director of Engineering Graduate Studies. Students planning to seek a degree should complete an application for graduate studies to assure acceptability and compatibility of courses with degree requirements.

Advisor

Each candidate for the Master's degree shall be appointed an Advisor by the Depart-

mental Chairman or the Program Director. The Advisor shall be agreed upon by the student and approved by the Director of Graduate Studies. The duties of the Advisor are to assist the student in the preparation of his plan of study and to advise him during his period of graduate work. An Advisor should be appointed prior to initial registration for graduate studies but no later than the end of the first semester. A change of Advisor at a later date is permissible upon the request of the student and approval of the Departmental Chairman or Program Director and the Director of Graduate Studies.

Plan of Study

The Plan of Study shall include the specific courses the student is expected to complete and all other requirements of the particular Master's degree he is seeking. The Plan of Study for the degree must be filed in the School of Engineering, Graduate Studies Office, prior to the pre-enrollment date for the 16th graduate credit hour. All copies must be approved by the Advisor, Program Director and the Director of Engineering Graduate Studies.

Thesis

Each student whose Plan of Study requires a thesis must prepare the thesis in accordance with the general format, outlined in the Guide for Preparation of Thesis, copies of which are available in the departmental offices. Students, who have completed registration in all courses, but who have not completed the thesis, must request approval for continuance in the graduate program by means of a Graduate Student Program Approval form each term until graduation. In general, the thesis will be based on work accomplished on research in the primary area of study. Joint authorship is not permitted. A regular grade will be assigned upon satisfactory completion of the thesis and will be included in the final cumulative grade point average.

Oral and Written Examinations

There is a requirement for a final examination at the completion of the thesis. The examination may be either oral, written or both. The examination must be given by a committee of no fewer than three. A student who fails to pass either the written or oral final examination cannot be given another examination in the same semester. No student shall be allowed to take the examination more than three times.

DOCTORAL DEGREE REGULATIONS

The School of Engineering offers two degrees at the Doctoral level, (a) *Doctor of Philosophy in Engineering* and (b) *Doctor of Engineering*. These degrees are the highest earned degrees conferred by the University of Dayton and are restricted to those scholars who have demonstrated a superior ability in scholarship and research. The two degrees are designed to meet different objectives of the individual students.

The *Doctor of Philosophy* (PhD) is the highest degree granted in recognition of high achievement in scholarship and independent research. Graduate programs leading to the Doctor of Philosophy degree currently encompass major fields of study in Aerospace, Electrical, Materials, and Mechanical Engineering.

The *Doctor of Engineering* (DE) is the highest professional degree granted in recognition of high achievement in scholarship and superior ability to apply the fundamentals of engineering to the solution of technical problems. This professional Doctor of Engineering degree is comparable in rigor to the PhD. It requires a broad Doctoral level program of course work, an internship within the profession of engineering, and a practice-oriented dissertation. The areas of concentration for the DE will be within the graduate programs of Aerospace, Electrical, Materials, and Mechanical Engineering with major support from Chemical Engineering, Civil Engineering, and Engineering Management. Interdisciplinary study and applied research activities are required.

Admission Requirements

Normally, a student must earn a Master's degree in engineering or science before being granted permission to continue graduate study work for the Doctoral degree. Outstanding students may be permitted to work for the Doctoral degree directly without a Master's degree. Admission means only that the student will be permitted to enroll for graduate courses. It does not necessarily imply that he will be admitted to a program leading to a Doctor's degree or that he will be able to achieve the Doctor's degree.

Notice of Intention

Before taking additional courses after completing the requirements for a Master's degree or equivalent graduate hours, a student who expects to work for the Doctor's degree is required to file a "Notice of Intention" in the University Graduate Studies Office, if his intention is to become a candidate for the degree. The "Notice of Intention" form may be obtained in the School of Engineering as well as the Office for Graduate Studies. Unless this is accomplished, the courses taken beyond the Master's degree requirement may possibly not be accepted toward a Doctoral degree. The "Notice of Intention" must be filed prior to mid-term of the first semester of enrollment.

Temporary Advisor

After the receipt of the "Notice of Intention" of a student to become a candidate for either the PhD or DE degree, the Director of Engineering Graduate Studies, upon recommendation of the Program Director, will designate a member of the Graduate Faculty to serve as temporary Advisor to the student. A temporary Advisor will assist the student in the initial selection of courses for the first semester of enrollment.

Advisory Committee

Before the end of the first semester, the student should consult with the Program Director and select a major professor to serve as the chairman of his advisory committee and to direct his research. An advisory committee of not less than three Graduate Faculty members from the School of Engineering will then be recommended for approval to the Director of Engineering Graduate Studies. The composition of the committee will generally reflect the student's area of course study and research in-

terest. At least one person, who has Graduate Faculty status, will be appointed by the Director of Engineering Graduate Studies. The duties of the advisory committee shall consist of (1) advising the student, (2) assisting the student in preparing the complete Program of Study, (3) preparing and administering the candidacy examination, (4) assisting in the planning and conducting of the research, (5) approving the dissertation and (6) conducting and reporting the results of the final examination. Appointment of additional members of the committee, drawn outside the School of Engineering (i.e. other University faculty, adjunct professors, prominent researchers in Industry or Government) is encouraged. The majority of the committee must be members of the School of Engineering Graduate Faculty.

Qualifying Examination

After the completion of his Master's degree or 30 semester hours of graduate study, the student will take a qualifying examination (may be waived by the Graduate Study Committee for exceptional students with a Master's degree in engineering). The purpose of the examination is to determine the student's qualifications to continue graduate study and to assist the advisory committee in planning the Program of Study. The examination shall be written and oral and will cover the subject matter of graduate courses taken, the student's ability to conduct research, express himself, to reason, and to integrate his knowledge. Students are required to provide evidence of personal research accomplishments (i. e. thesis, research projects, science and engineering technical reports, etc.) as part of the examination.

Plan of Study

The Plan of Study shall include all the graduate work the student is expected to complete as determined by his advisory committee. The Plan of Study is to be submitted before the end of the first semester or prior to the pre-enrollment date for the 16th graduate hour beyond the Master's degree or its equivalent. The plan shall include the specific courses and all other requirements (seminars, tools of research, research, etc.) which the student is expected to complete, indicating the time and manner in which these requirements are to be met.

Credit Hour Requirements

The minimum time required for the Doctor's degree is six semesters of full-time graduate study (a minimum of 90 semester credit hours) beyond the Bachelor's degree, or four semesters of full-time graduate study (a minimum of 60 semester credit hours) beyond the Master's degree. This includes the credit hours for the Doctoral dissertation (a minimum of 30 semester credit hours). Registration for dissertation credit hours is the same as for other courses. A minimum of 48 semester credit hours must be taken at this University. A minimum of 12 semester credit hours in graduate mathematics beyond the Bachelor's degree is required for both Doctoral degrees. A student is required to complete a minimum of 30 semester credit hours in his major area of study beyond his Bachelor's degree for the PhD degree excluding his dissertation credit hours. A student is required to have one major and two minor areas of study for the DE degree. A minimum of 21 credit hours in his major and 12

credit hours in each minor is required beyond the Bachelor's degree. One minor must be in an engineering area outside of his major field of study. The student is encouraged to complete the other minor area of study outside of engineering.

To meet the requirements for the Doctor's degree, the student must satisfactorily complete a specified number of credit hours of course work with a 3.0 or better cumulative grade point average (based on a 4.0 grading system). The student must also (1) pass the candidacy examination, (2) meet the period of concentrated study requirements, (3) complete an acceptable dissertation, (4) complete the tools of research requirement, (5) demonstrate the ability to accomplish independent study, (6) pass a final examination and (7) complete other requirements as specified by his Advisory Committee and the School of Engineering. The DE degree also requires one year of internship.

Internship for DE Degree

The internship for the Doctor of Engineering Degree is a minimum of one year of high level practicing engineering experience, and is normally conducted after the student has passed his Candidacy Examination. The purpose of the internship is to provide the candidate high level professional engineering experience, which is considered essential for the professional Doctor of Engineering degree. The internship phase of the program must be fully described in the proposal that is submitted as part of the Candidacy Examination. The candidate's internship Advisor (generally his supervisor at his interning organization) will be added as a member of his advisory committee. The internship, as part of the DE Program of Study, must be approved by the candidate's Advisory Committee, Program Director and the Director of Engineering Graduate Studies. From 15 to 21 semester hours can be credited for the internship as part of the dissertation requirement for the Doctor of Engineering degree.

Tools of Research

The needs of the student may differ with the educational objectives chosen. Therefore, the requirements for Tools of Research will be determined by the Advisory Committee and approved by the Department Chairman or the Program Director and selected, one, from the following:

a. Command of one approved language, as evidenced by a satisfactory score on the Graduate Foreign Language Tests (GSFLT) in French, German or Russian.

b. Complete 6 semester hours of 400 level or higher courses in computer science and/or instrumentation measuring techniques with a "B" average.

c. Complete 6 semester hours of graduate courses in a defined area of humanities and/or social sciences, related to his program or study objectives, with a "B" or higher.

Courses taken in completing the Tools of Research requirement will not carry credit toward the degree. The method selected in satisfying this requirement is to be listed in the Plan of Study. This requirement must be satisfied prior to the Candidacy Examinations.

Period of Concentrated Study

The primary purpose of this requirement is to allow the faculty to observe the overall development of the candidate who may be awarded the Doctoral degree. Also, this requirement provides an opportunity for the candidate to associate with the faculty and other students in the University environment.

A student must engage in a period of concentrated graduate study during three consecutive semesters with a minimum completion of 21 graduate credit hours or two of three consecutive semesters with a minimum completion of 9 graduate credit hours per semester. Period of Concentrated Study requirements must be met after the student has completed his Master's program or its equivalent and the filing of a "Notice of Intention."

Candidacy Examination (Doctor of Philosophy)

The Candidacy Examination for the PhD degree is generally to be taken when most of the course work has been completed as outlined on the approved Plan of Study. The purpose of the examination is to determine the student's eligibility to become a candidate for the Doctor of Philosophy degree. The examination will be comprehensive, covering the entire area of the student's graduate study. The examination will be both written and oral and administered under the direction of the Advisory Committee. No less than three members of the School of Engineering Graduate Faculty must participate in the preparation and the administering of the examination. The oral examination must follow the written examination by a minimum period of two weeks. The Director of Engineering Graduate Studies has the right to appoint additional members to the examination committee and he must be informed of the date and place of the examinations and the membership of the examining committee at least two weeks before the examinations are to be given.

As part of the examination, the student must have completed a research proposal outlining in detail his proposed area of study for his dissertation. The proposal should clearly show the review of the literature in the area, the need and the uniqueness of the research, general approach to accomplishing the effort, expected results, detail cost, laboratories and facilities needed and schedule of completion. A copy of the research proposal must be made available to each committee member prior to the written examination. The University of Dayton is not obligated for providing resources for this investigation.

The candidate must pass all parts of the examination (research proposal, written examination, and oral examination) to be admitted to candidacy. If the candidate does not pass any part of the examination, he will be notified in writing of the conditions for another examination. No candidate will be permitted to take the examination more than twice. A second examination may not be given earlier than four months after failure. The candidate is considered to pass only when the decision of the examing committee is unanimous. All members must sign the examination form with an indication of their decision noted prior to it being submitted to the Director of Engineering Graduate Studies.

A student must be admitted to candidacy at least six months prior to receiving his Doctor's degree.

Candidacy Examination (Doctor of Engineering)

The Candidacy Examination for the DE degree is generally to be taken when most of the course work has been completed as outlined on the approved Plan of Study. The purpose of the examination is to determine the student's eligibility to become a candidate for the Doctor of Engineering degree. The examination will be comprehensive, covering the entire area of the student's graduate study. The examination will be both written and oral and administered under the direction of the Advisory Committee. No less than three members of the School of Engineering Graduate Faculty must participate in the preparation and the administering of the examination. The oral examination must follow the written examination by a minimum period of two weeks. The Director of Engineering Graduate Studies has the right to appoint additional members to the examination committee. He must be informed of the date and place of the examinations and the membership of the examining committee at least two weeks before the examinations are to be given.

As part of the examination, the student must have completed an applied research project-oriented proposal outlining in detail his proposed area of investigation for his dissertation. The proposal should clearly show the review of the literature in the area, the need and the uniqueness of the development investigation, the interdisciplinary role of the investigation, general approach to accomplishing the effort, expected results, detail cost, laboratories and facilities needed and schedule of completion. A copy of the proposal must be made available to each committee member prior to the written examination. The University of Dayton is not obligated for providing funds for the investigation.

The candidate must pass all parts of the examination (proposal, written examination, and oral examination) to be admitted to candidacy. If the candidate does not pass any part of the examination, he will be notified in writing of the conditions for another examination. No candidate will be permitted to take any part of the examination more than twice. A second examination may not be given earlier than four months after failure. The candidate is considered to pass only when the decision of the examining committee is unanimous. All members must sign the examination report form with an indication of their decision noted prior to it being submitted to the Director of Engineering Graduate Studies.

A student must be admitted to candidacy at least six months prior to receiving his Doctor's degree.

Dissertation (Doctor of Philosophy)

A dissertation is required of each PhD candidate (student who has passed the Candidacy Examination) and is expected to make an original contribution to technical knowledge. The contribution will be of sufficient importance to merit publication. The dissertation topic will be determined by the student in consultation with his Advisor and approved by his Advisory Committee, Program Director and the Director of

Engineering Graduate Studies. The candidate must prepare a dissertation presenting the results of his research investigation. The first draft of the dissertation should be in the hands of the Advisor a minimum of six weeks before the end of the semester the degree is sought. Four copies of the dissertation in final form and 10 copies of the abstract must be submitted to the Engineering Graduate Studies Office at least four weeks before the end of the semester the degree is sought. These copies must bear the written approval of the Advisor. The dissertation will be prepared in accordance with instructions outlined in the Guide for Preparation of Dissertation, copies of which are available in the Engineering Administration Office. Also, an abstract not to exceed 600 words will be prepared for submittal to sources for possible acceptance of a publication. A list of technical journals should be attached as possible sources of publication.

The original copy of the dissertation and two copies of the abstract shall be filed in the Library one week prior to the end of the semester.

The student must obtain approval from his Advisory Committee to undertake all or part of his dissertation in absentia. A report requesting this permission must be submitted to the Director of Engineering Graduate Studies outlining in detail the relationship between the Advisor and the candidate and the name and background of the individual, who will directly advise the candidate during the accomplishment of this independent research. This individual will be added to his Advisory Committee.

Candidates must be registered for a minimum of two credit hours every semester during their candidacy including the semester the final examination is taken.

Dissertation (Doctor of Engineering)

A dissertation is required of each DE candidate (student who has passed the Candidacy Examination) and is expected to be an original investigation as applied to engineering practice. Normally, the dissertation will be related directly to the candidate's internship or problems relating to his engineering experience or work. The practice-oriented dissertation must be a significant contribution of independent engineering work to merit a doctoral level publication. The dissertation topic will be determined by the student in consultation with his Advisor and approved by his Advisory Committee, Program Director and the Director of Engineering Graduate Studies. The candidate must prepare a dissertation presenting the results of his investigation. The first draft of the dissertation should be in the hands of the Advisor a minimum of six weeks before the end of the semester the degree is sought. Four copies of the dissertation in final form and 10 copies of the abstract must be submitted to the Engineering Graduate Studies Office at least four weeks before the end of the semester the degree is sought. These copies must bear the written approval of the Advisor. The dissertation will be prepared in accordance with the instructions outlined in the Guide for Preparation of Dissertation, copies of which are available in the Engineering Administration Office.

The original copy of the dissertation and two copies of the abstract shall be filed in the Library one week prior to the end of the semester.

The student must obtain approval from his Advisory Committee to undertake

all or part of his dissertation in absentia. A report requesting this permission must be submitted to the Director of Engineering Graduate Studies outlining in detail the relationship between the Advisor and the candidate and the name and background of the individual, who will be directly advising the candidate during the accomplishment of this independent research. This individual will be added to the Advisory Committee.

Candidates must be registered for a minimum of two credit hours every semester during their candidacy including the semester the final examination is taken.

Microfilm

All Doctoral dissertations are microfilmed by the University Microfilm, Inc., Ann Arbor, Michigan. The candidate must sign an agreement with the University Microfilm, Inc., which authorizes this firm to sell microcopies of his dissertation. Microfilmed dissertations may be copyrighted by the candidate. Fees will be assessed for the cost of microfilming.

Final Examination

A candidate shall be given a final examination after the dissertation has been accepted by the Engineering Graduate Office. The examination cannot be given earlier than six months after passing the candidacy examination. The examination shall be oral and primarily directed toward the defense of the dissertation, though it need not be confined exclusively to the dissertation. The candidate must demonstrate to the examining committee that he has all the capabilities for which the Doctor's degree is awarded. The examination is open to all members of the University of Dayton faculty and student body. The candidate is responsible for providing the examining committee with copies of his dissertation in final form at least ten days before the examination. The candidate is responsible for disseminating the announcement of his final examination to interested organizations at least ten days prior to the examination.

The final examining committee shall consist of no less than four members of the Graduate Faculty. The candidate's Advisor acts as the chairman and the other members will normally include the members of the candidate's Advisory Committee. At least one member of the examining committee of Graduate Faculty status, who is not directly involved in the program concerned, will be appointed by the Director of Engineering Graduate Studies. The Director of Engineering Graduate Studies reserves the right to appoint additional committee members and must be informed of the place and time of the final examination at least ten days in advance.

After the examination, the committee will report its decision to the Director of Engineering Graduate Studies. In order to be satisfactory, the report of the examining committee must be unanimous and signed by all members. If the candidate fails by only one vote, the case will be referred to the Graduate Study Committee for appropriate action.

Time Limit

Students are expected to complete the requirements for the Doctor's degree within five years after the candidacy examination has been passed. Failure to complete the requirements means that his admission to candidacy will be cancelled.

THE MASTER OF SCIENCE IN ENGINEERING PROGRAM

The Program of Study leading to the degree of Master of Science in Engineering must include a minimum of 30 credit hours of the following:

1. 12 credit hours in major area;
2. 12 credit hours of electives;
3. 6 credit hours of research on an approved project.

THE MASTER OF SCIENCE IN ENGINEERING—AEROSPACE PROGRAM

The Program of Study leading to the degree of Master of Science in Engineering—Aerospace Program must include a minimum of 30 credit hours consisting of the following:

1. 12 credit hours in major area;
2. 12 credit hours of electives;
3. 6 credit hours of research on an approved project.

Courses:

1. Major areas of study include: Flight Mechanics, Stability and Control, Fluid Mechanics, Design and Performance, Materials and Structures, Propulsion, Energy Conversion, Heat and Mass Transfer.
2. Electives will be selected from Engineering courses outside of major area or Mathematics and/or Science courses. Selected courses must meet the approval of the Advisor.
3. Research projects may be replaced by 6 credit hours of additional course work with the approval of the Advisor and the Program Director.

THE MASTER OF SCIENCE IN ENGINEERING—MATERIALS PROGRAM

The Program of Study leading to the degree of Master of Science in Engineering—Materials Program must include a minimum of 30 credit hours consisting of the following:

1. 12 credit hours in the major field;
2. 12 credit hours of approved electives;
3. 6 credit hours of research on a Materials Engineering project or thesis.

Courses:

1. Major Field
   12 credit hours to be selected from the student's major field.
2. Electives
   12 credit hours to be selected from current course offerings which best suit the student's requirements.
3. Research Project six credit hours
   Upon the request of the student, and with the approval of the faculty Advisor and the Program Director, the project may be replaced by 6 credit hours of additional course work.

THE MASTER OF SCIENCE IN ENGINEERING—MANAGEMENT PROGRAM

The Program of Study leading to the degree of Master of Science in Engineering Management is inter-disciplinary and is offered by the School of Engineering with the cooperative participation of the School of Business Administration, the School of Education, and the College of Arts and Sciences. It must include a minimum of 36 credit hours consisting of the following:

1. 18 credit hours in Engineering Management;
2. 9 credit hours in a Cognate Field
   Applied Mathematical Systems
   Business Administration and Systems
   Education Engineering Systems
   Public Engineering Systems
3. 9 credit hours in electives.

Courses:

1. Major Field: Engineering Management
   Eighteen credit hours to be selected from the graduate level Engineering Management courses. If a student so elects, a thesis may be substituted for six credit hours of course work.
2. Cognate Fields
   Some of the courses listed in the Cognate Fields may require prerequisites depending on the discretion of the instructor.
   a. Applied Mathematical Systems
      The cognate field of Applied Mathematical Systems allows the student to specialize in the area of mathematical system theory. Courses in this option can be chosen from the departments of Mathematics and Electrical Engineering.

      3 credit hours, one course, to be selected from the following list:

      MTH 519
      MTH 531
      MTH 565

      6 credit hours, two courses, to be selected from the following list:

MTH 519	MTH 532	ELE 515
MTH 520	MTH 561	ELE 531
MTH 521	MTH 562	ELE 532
MTH 522	MTH 565	ELE 533
MTH 525	ELE 509	ELE 534
MTH 526	ELE 514	ELE 535
MTH 531		

   b. Business Administration and Systems
      The cognate field of Business Administration and Systems allows the stu-

dent to prepare for a career in the management and administration of economic and business systems. Courses in this option are taken from the MBA program of the School of Business.

6 credit hours, two courses, to be selected from the following list:

MBA 520	MBA 550
MBA 530	MBA 560
MBA 540	

3 credit hours, one course, to be selected from the following list:

MBA 581
MBA 582
MBA 583

e. Educational Engineering Systems

The cognate field of Educational Engineering Systems allows the student to prepare for a career as a policy and management analyst for school districts and institutions of higher learning. Courses in this option can be chosen from the School of Education.

Required Course:

EdA 506 (or one other approved course)

6 credit hours, two courses, to be selected from the following list:

EdF 501	EdF 518
EDF 503	EdA 521
EdA 509	EdC 533
EdA 511 or 512	EdS 589
EdA 513 or 514	EdF 590
EdA 517	EdF 596 or 597 (with permission)

d. Public Engineering Systems

The cognate field of Public Systems Engineering allows the student to prepare for a career as a policy and management analyst for governmental and public organizations. Courses in this option can be chosen from the Public Administration Program of the Department of Political Science.

Required Course:

POL 510

6 credit hours, two courses, to be selected from the following list:

POL 521	POL 545	POL 576
POL 535	POL 552	POL 578
POL 540	POL 575	POL 595

3. Electives

Nine credit hours of electives from graduate courses approved by the Advisor and selected from any approved graduate program of the University.

Examinations:

A final examination at the completion of the thesis is required.

THE MASTER OF SCIENCE IN CHEMICAL ENGINEERING PROGRAM

The Program of Study must include a minimum of 30 credit hours consisting of the following:

1. 3-6 credit hours in Basic Sciences;
2. 15 credit hours in Chemical Engineering;
3. 3-6 credit hours of electives;
4. 6 credit hours on an approved thesis project.

Courses:

1. Basic Sciences
   3-6 credit hours to be selected from the basic sciences taught by the Mathematics and Science Departments.
2. Chemical Engineering
   15 credit hours to be selected from the graduate level Chemical Engineering courses. CME 507, CME 521, and CME 581 must be included in the 15 credit hour requirement.
3. Electives
   3-6 credit hours of electives as approved by the advisor and department chairman.
4. Thesis
   CME 599 6 credit hours on an approved thesis project.

Examinations:

A final examination at the completion of the thesis is required.

THE MASTER OF SCIENCE IN CIVIL ENGINEERING PROGRAM

The Program of Study must include a minimum of 30 credit hours consisting of the following:

1. 3-6 credit hours in Basic Sciences;
2. 18-21 credit hours in Civil Engineering, Engineering Mechanics or thesis related subjects;
3. 6 credit hours on an approved thesis project.

Courses:

1. Basic Sciences
   3-6 credit hours are to be selected from the general basic science group taught by the Mathematics and Science Departments.

2. Civil Engineering, Engineering Science, or Thesis Supporting Courses
   18-21 hours to be selected from the following courses:
   Civil Engineering graduate level courses.
   Engineering Mechanics
   Thesis Supporting Courses approved by the student's advisor.
3. Thesis
   Cie 599 6 credit hours on an approved thesis project.

Examinations:

A final examination at the completion of the thesis is required.

THE MASTER OF SCIENCE IN ELECTRICAL ENGINEERING PROGRAM

The program of study must include a minimum of 30 credit hours consisting of the following:

1. 6 credit hours in Basic and Engineering Sciences;
2. 12 credit hours in Electrical Engineering;
3. 6 credit hours in Thesis Supporting Courses approved by the student's advisor;

Courses:

1. Basic and Engineering Sciences
   6 credit hours are to be selected from either the general basic science group taught by the Mathematics and Science Departments, or from appropriate courses listed in the Master of Science in Engineering Program. It is permissible to combine three credit hours from each program. Selected courses must meet with the approval of advisor.
2. Electrical Engineering
   12 credit hours to be selected from the graduate level Electrical Engineering courses.
3. Thesis Supporting Courses
   6 credit hours in Thesis Supporting Courses approved by the student's advisor.
4. Thesis
   Ele 599 6 credit hours on an approved Thesis Project.

Examinations:

A final examination at the completion of the thesis is required.

THE MASTER OF MECHANICAL ENGINEERING PROGRAM

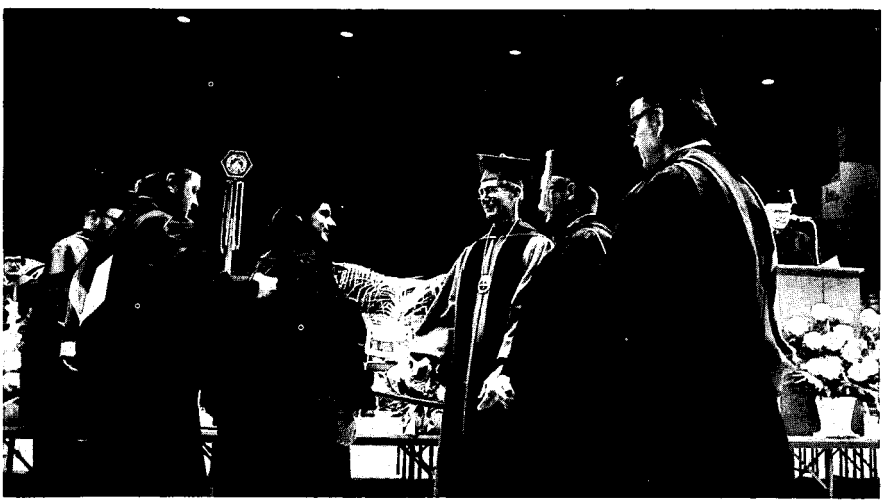
Programs of Study leading to the degree of Master of Mechanical Engineering with major areas of study in Materials Engineering, Thermal Engineering, Fluid Mechanics, Solid Mechanics and Mechanical Design must include a minimum of 30 credit hours consisting of the following:

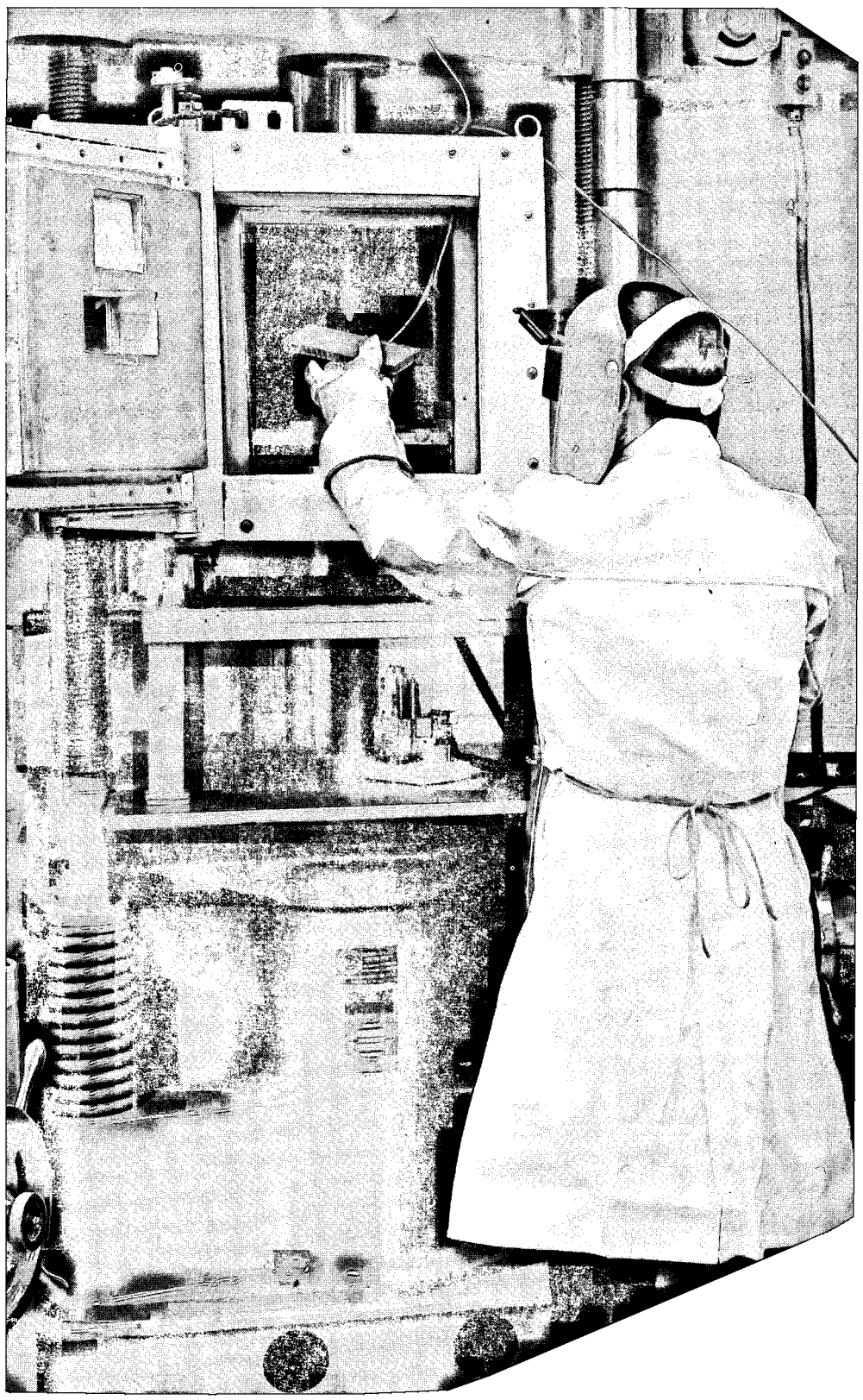
1. 12-15 credit hours in Mechanical Engineering;

2. 6 credit hours in Mechanical Engineering Project, or other courses if approved;
3. 9-12 credit hours of electives.

Courses:

1. Mechanical Engineering
   12-15 credit hours to be selected from the following courses: Materials Engineering—MEE 501, MEE 502, MEE 505, MEE 506, MEE 508, MEE 590A.
   Thermal Engineering—MEE 500, MEE 511, MEE 512, MEE 513, MEE 514, MEE 515, MEE 516, MEE 517, MEE 518, MEE 519, MEE 565, MEE 566, MEE 590B, MEE 595.
   Fluid Mechanics—MEE 500, MEE 516, MEE 521, MEE 522, MEE 523, MEE 590C, MEE 595.
   Solid Mechanics—MEE 500, MEE 533, MEE 534, MEE 535, MEE 537, MEE 538, MEE 539, MEE 590D, MEE 595.
   Mechanical Design—MEE 500, MEE 531, MEE 532, MEE 533, MEE 534, MEE 535, MEE 536, MEE 537, MEE 538, MEE 539, MEE 540, MEE 545, MEE 590E, MEE 595.
2. Mechanical Engineering Project
   MEE 550 Mechanical Engineering Project.....one to six credit hours
   Upon the request of the student, and with the approval of the faculty Advisor and the Department Chairman, the project may be replaced by 6 credit hours of additional course work.
3. Electives
   9-12 credit hours to be selected from current course offerings which best suit the student's requirements.





VIII Departments of Instruction

American Studies (AmS)

Dr. Francis Henninger, *Director*

AMS 590. (3) INTERDISCIPLINARY RESEARCH. A study of the principles of interdisciplinary scholarship as well as of what can and probably cannot be accomplished by it. The course provides a student contact with a teacher and other similarly occupied students on a regular basis. The end product of the course is the final achievement of the student's program: a self-designed study of information from at least two disciplines.

Biology (BIO)

Dr. George B. Noland, *Chairman*

Any upper level undergraduate course in biology may be taken for graduate credit if approved as a part of the student's program.

BIO 501. (1) SEMINAR. Presentation and analysis and discussion of data dealing with biological research of current interest. Required each semester of graduate students in Biology.

BIO 502. (3) VERTEBRATE ZOOLOGY. An advanced course dealing with the morphology, physiology, ecology and distribution of representative vertebrate groups. Three hours lecture per week.

BIO 502L. (1) A laboratory and field course dealing with the morphology, physiology, ecology and distribution of vertebrate groups.

BIO 512. (4) RADIATION BIOLOGY. A course dealing with principles concerning the nature of ionizing radiation, its use in studying biological systems and its effect on organisms. Two hours lecture and two two-hour labs per week.

BIO 514. (3) BIOCHEMISTRY. Lectures and selected readings dealing with carbohydrates, lipids, amino acids, proteins, enzymes, nucleic acids and the metabolism of those compounds. Three hours lecture per week.

BIO 515. (3) BACTERIAL PHYSIOLOGY. Lectures, assigned readings and discussions dealing with the structure, function and biochemistry of bacteria and the organelles. Three hours lecture.

BIO 517. (3) ENDOCRINOLOGY. Discussion of hormonal regulation of metabolism, growth and reproduction. Three hours lecture.

BIO 517L. (1) ENDOCRINOLOGY LAB. Laboratory dealing with functional analysis of the mechanisms and activity of the endocrine system.

BIO 518. (3) CYTOLOGY. The molecular basis for structure in animal and plant cells, including consideration of organization, function, and development of subcellular organelles and energy transduction.

BIO 518L. (2) CYTOLOGY LAB. Isolation and chemical characterization of cellular organelles. Other experimental studies on cellular functions. Two three-hour labs per week.

BIO 519. (3) VIROLOGY. Lectures, selected readings and laboratory assignments dealing with the biology of plant, animal and microbial viruses. Tissue culture techniques will be considered. Two hours lecture and one three-hour lab per week.

BIO 521. (2) BIOCHEMICAL GENETICS. An analysis of the nature of the gene and gene action. Particular attention will be given to genetic control of protein synthesis and to recent advances in biochemical and physiological genetics. Two hours lecture and one three-hour lab per week.

BIO 521L. (1) BIOCHEMICAL GENETICS LAB. A laboratory to accompany Bio 521 employing an experimental approach to genetic problems. Students work the entire term on a project of their choice.

BIO 522. (3) IMMUNOLOGY. Discussion of antigens, antibody, antigenicity, immunogenicity and antigen-antibody reactions including hypersensitivity, immune tolerance and transplants. Biochemistry recommended.

BIO 523. (3) ADVANCED MICROBIOLOGY. Lectures, readings and discussions dealing with current concepts in basic and applied microbiology, with emphasis on modern methods of microbial taxonomy, major groups of bacteria, microbial ecology and industrial fermentations.

BIO 524. (3) CELL PHYSIOLOGY. The molecular basis for structure and function and energy transduction in animal and plant cells as well as the organization, function and development of membrane and subcellular organelles will be considered.

BIO 524L. (1) CELL PHYSIOLOGY LABORATORY. Isolation and chemical characterization of cellular organelles, study of cell structure by light microscope.

BIO 530. (3) COMPARATIVE ANIMAL PHYSIOLOGY. Organized on a function-system basis, the course deals with environment-organism inter-action and with integrative systems of the principal phyla of animals. Three hours lecture per week.

BIO 530L. (1) COMPARATIVE ANIMAL PHYSIOLOGY LABORATORY. Laboratory to accompany Bio. 530. Must be taken concurrently with Bio 530.

BIO 531. (3) EXPERIMENTAL EMBRYOLOGY. Morphological and physiological aspects of development will be considered along with an introduction to teratology. Three hours lecture per week.

BIO 531L. (1) EXPERIMENTAL EMBRYOLOGY LAB. Laboratory to accompany Bio 531.

BIO 532. (3) VERTEBRATE MORPHOLOGY. The general biology of vertebrates with emphasis on the structure and function of morphological systems. Consideration is given to the mechanical aspects of skeletal structure, locomotion, feeding and circulation.

BIO 532L. (1) VERTEBRATE MORPHOLOGY LABORATORY. Dissection of animals from each vertebrate class with emphasis on morphological systems and specializations. Anatomical laboratory techniques will also be stressed.

BIO 533. (3) COMMUNITY ECOLOGY. A study of the composition, aspect, and ecological structure of biotic communities. The role of the community in specific terrestrial and aquatic ecosystems, in regard to energetics, mineral cycling, and response to environmental factors within major North American biomes will be considered.

BIO 534. (3) VERTEBRATE PALEONTOLOGY. The evolutionary history of the chordates. Emphasis is placed on the selection factors, morphological adaptations and paleoecology of the transitional groups and the higher classes.

BIO 534L. (1) VERTEBRATE PALEONTOLOGY LABORATORY. One or two one-day field trips, one overnight visit to a major museum, laboratory sessions examining extant and fossil skeletal material at U.D. and the Dayton Museum of Natural History.

BIO 535. (1-3) PROBLEMS IN FIELD BIOLOGY. A course designed to acquaint students with field oriented problems in biology.

BIO 536. (3) EVOLUTIONARY ECOLOGY. A course in principles of modern ecology, particularly as they relate to natural selection and evolutionary theory. Three hours lecture.

BIO 537. (3) BIOSYSTEMATICS. A study of the principles of classification, stressing the evidence used in phylogenic and evolutionary schema.

BIO 540. (3) PHYSIOLOGY OF HIGHER PLANTS. A course dealing with uptake and transport of materials, energy metabolism and growth in higher plants. Three hours lecture per week.

BIO 540L. (1) PHYSIOLOGY OF HIGHER PLANTS LAB. Required laboratory to accompany Bio 540.

BIO 550. (3) BIOMETRICS. The design and analysis of experiments in quantitative biology. Rectilinear and curvilinear regression, correlation, and the distribution function of various statistics will be considered.

BIO 552. (4) BIOLOGICAL INSTRUMENTATION. A course dealing with the theory of separation, measuring and data handling techniques and their application to modern biology. Normally required of all graduate students. Two hour lecture and two two-hour labs per week.

BIO 553. (2) BIOLOGICAL INSTRUMENTATION. A continuation of Bio 552.

BIO 554. (4) ELECTRON MICROSCOPY. Theory and use of the electron microscope. Techniques for preparation of biological materials for viewing under the electron microscope. Normally, required of all who plan to use electron miscroscopy in their research. Two hours lecture and two three-hour labs per week.

BIO 580. (3-6) CLINICAL STUDIES: ("Topic"). Hospital or other clinical experience in patient-oriented areas of biology such as microbiology, mycology, immunology, parasitology and physiological chemistry. Permission required.

BIO 596. (1-3) CURRENT BIOLOGICAL PROBLEMS. The consideration of recent developments in biological thought and procedure. By permission of Chairman only.

BIO 599. (3-6) THESIS.

BIO 601. (1) SPECIAL TOPICS. The development, presentation, and discussion of topics in specialized areas of biology. Required of all graduate students each semester.

BIO 699. (1-6) PH.D. DISSERTATION.

Business Administration (MBA)

William J. Hoben, *Dean*

MBA 500A. (3) GRADUATE SURVEY IN ECONOMICS. Basic economics principles and their application. Considers consumer behavior, production theory, and the interaction of buyers and sellers in various kinds of markets; national income, monetary policy, fiscal policy, and the economic role of the government in the United States.

MBA 500B. (3) GRADUATE SURVEY IN ACCOUNTING. An introduction to the basic principles and concepts of accounting and of the financial statements, with emphasis on understanding accounting terminology and the reasons for accounting conventions and practices; includes an introduction to management uses of accounting data and reports.

MBA 500C. (3) GRADUATE SURVEY IN MARKETING. Development of a framework within which the marketing process can be critically examined, including analysis of the societal and legal constraints imposed upon the marketing process. Introduction to a variety of concepts associated with the Macro character of marketing including consumption systems, distribution systems, promotional activities, product development, and pricing.

MBA 500D. (3) GRADUATE SURVEY IN MANAGEMENT. Development of conceptual understanding of the management process, current management theories and principles, management terminology, systematic approach to problem solving and decision making, review of current management research and management literature.

MBA 500E. (3) GRADUATE SURVEY IN STATISTICS. A course in applied statistics. Considers measures of central tendency and dispersion, frequency distributions, probability, sampling, hypothesis testing, and simple correlation; introduction to regression analysis.

MBA 501. (3) MANAGERIAL ACCOUNTING. Practical emphasis on the accountant's role in business measurement techniques, communication, prediction, and decision-making based upon the use of relevant accounting information.

MBA 503. (3) INFORMATION SYSTEMS. Latest concepts, methods, and advanced developments in information systems emphasizing the implementation of office automation; the business survey, selection of methods, designing the system, and preparing the report; the problems of communication with technical staff specialists. Prerequisite: MBA 501.

MBA 504. (3) TAX FACTORS IN BUSINESS DECISIONS. An organized review of the provisions of the Federal Income Tax Code and tax laws on business decisions, including selection of the legal form of the business entity, corporate reorganization, acquisitions, and mergers, employee compensation and benefits, alternative methods of capital gains and ordinary income, and interactions of income, estate and gift taxes. Prerequisite: MBA 501.

MBA 505. (?) CONTEMPORARY ACCOUNTING ISSUES. A seminar covering important or controversial issues which are currently under discussion, designed for the student who has a strong accounting background. Includes a thorough examination of the business and financial situations which underlie accounting problems and controversies, describes alternative accounting techniques which are accepted or proposed, and evaluates the consequences of different accounting practices.

MBA 510. (3) QUANTITATIVE METHODS FOR BUSINESS DECISIONS. Business research methodology; problem definition and research design; application of statistical decision methods; introduction to mathematical analysis of business problems. Prerequisite: MBA 500E.

MBA 511. (3) APPLICATION OF MANAGEMENT SCIENCE IN BUSINESS. Application of mathematical and statistical methods to business decision-making in the fields of marketing, production, finance and related areas; basic nature and methods of Management Science; the use of decision theory and techniques such as linear programming, queuing, inventory, and Monte Carlo methods. Prerequisites: MBA 500E and some calculus (differentiation and integration) or permission of instructor.

MBA 520. (3) FINANCIAL POLICIES OF ENTERPRISES. A study of finance with emphasis upon the financial policies and problems of business, especially within the corporation. Consideration is given to institutions and other investors in supplying funds for enterprise. Prerequisite: MBA 501.

MBA 521. (3) PROBLEMS OF FINANCE. The application of principles of finance to the financial management of corporate enterprise with special attention to the financing of expansion. Reading assignments, cases, individual reports and discussion of current financial problems. Prerequisite: MBA 520.

MBA 530. (3) MARKETING MANAGEMENT. Examination of a variety of concepts, theories, facts, and analytical procedures associated with marketing management. Emphasis centered on market analysis—consumer behavior, competitor analysis, marketing information systems, marketing research, and demand forecasting; emphasis also on marketing strategy—product, distribution, promotion, and pricing decisions.

MBA 533. (3) SEMINAR IN MARKET ANALYSIS. Identification and analysis of a variety of concepts, theories, facts, analytical procedures, and quantitative techniques associated with market analysis—consumer behavior, competitor behavior, marketing information systems, demand forecasting, and organizational strategies toward markets. Where possible an actual case study will be conducted in order to provide the student practical experience in market analysis. Prerequisite: MBA 530.

MBA 534. (3) SEMINAR IN ADVANCED MARKETING STRATEGY. In-depth analysis of a variety of concepts, theories, facts, analytical procedures, quantitative techniques, and models associated with marketing strategy—product, distribution, pricing and promotion. Where possible an actual case study will be conducted in order to provide the student practical experience in development of marketing strategy.

MBA 540. (3) MANAGERIAL ECONOMICS. Examination of the scope and method of managerial methods in demand analysis, forecasting demand, short-run cost analysis; long-run costs and production functions; pricing, selected topics in pricing; capital budgeting, risk, and uncertainty. Prerequisites: MBA 500E and MBA 510 (or MBA 511).

MBA 541. (3) LABOR RELATIONS AND LABOR ECONOMICS. A study of labor relations and labor economics; collective bargaining, wage determination, structure and operation of labor markets, direction of the labor movement, theories of industrial peace and conflict; current problems and trends in labor relations.

MBA 545. (3) NATIONAL ECONOMIC POLICY AND FORECASTING. The purpose of this course is to present the student with an understanding of the general economic environment in which a business firm operates. Focuses on the movement and inter-relationships of economic aggregates such as employment, prices, income, and the money supply. An understanding of the inter-relationship of economic aggregates provides the foundation for forecasting these variables. Close attention is also given to contemporary policy issues that affect the business community. These issues include: Stagflation, cost-push inflation, monetary vs. fiscal policy, wage and price controls and structural unemployment. Prerequisites: Principles of Economics or MBA 500A.

MBA 550. (3) GOVERNMENT AND BUSINESS. Analysis of the economic aspects and consequences of government regulations over social and business activities; a study of government and business relations.

MBA 560. (3) OPERATIONS MANAGEMENT. An analysis of the principles of organization and management; the theory of organization and the principles of planning, directing and controlling product development, plant layout and location, equipment, inventory and production standards.

*MBA 570. (3) BUSINESS AND SOCIETY. Business is presented as a private and quasi-public institution between community and society with definite functions of its own as well as those which foster the dignity of man and the interests of the common good.

*Required of all students.

MBA 581. (3) ADMINISTRATIVE MANAGEMENT PRACTICES. An in-depth analysis of concepts, principles, and theories of the management process with emphasis upon application in administrative decisions and practice. The relating of administrative management practices to the systems concept and environmental factors. Prerequisite: A Principles of Management course.

MBA 582. (3) ORGANIZATIONAL BEHAVIOR. The application of psychology to the problems of human behavior and human relations; the problems of motivation, morale, conflict, discipline, leadership, emotions and decision-making are considered and analyzed in lectures, cases and discussions.

MBA 583. (3) ADVANCED MANAGEMENT SEMINAR. An analysis in depth of several strategically important areas of management in which theory, research, and practice have progressed significantly in recent years; the applicability, potential and actual, of the newer concepts. Areas considered are: long range planning, management organization development, systems management, executive decision-making, organizational behavior, control techniques, and other selected topics.

MBA 584. (3) MULTI-NATIONAL BUSINESS POLICY. Examines changes in the structure, organization, and policies of Multi-National business firms and international trade in general. Analyzes their implications relative to the composition of exports, international marketing processes, terms of trade, and determinants of payments and exchange-rate movements.

MBA 585. (3) ORGANIZATIONAL SYSTEMS. The application of systems theory to the operation of governmental, business, and educational organizations. Conventional theories are related to the systems approach to an understanding of organizations.

*MBA 590. (3) BUSINESS POLICIES AND ADMINISTRATIVE MANAGEMENT. The correlation of theory and practice in the development of business policies. Emphasis will be on the problems of executive management, decision-making and administrative action.

*Required of all students.

MBA 595. (1-6) INDIVIDUAL RESEARCH. Individual research and study in subject areas encompassed by the MBA curriculum under the guidance and direction of faculty. No regular class schedule, but meetings arranged for presentation and discussion of individual research projects.

NOTE: There are a number of courses offered by the School of Business Administration that are available for either undergraduate or graduate courses. These courses amplify the range of choices for electives in Management, Marketing, Finance, Accounting, Economics, and Quantitative Analysis. Students should consult the course schedule for these courses.

Chemistry (CHM)

Dr. John J. Lucier, S.M., *Chairman*

CHM 540. (3) QUANTUM CHEMISTRY. An introduction to the concepts of quantum mechanics with applications to chemical systems.

CHM 541. (3) TOPICS IN PHYSICAL CHEMISTRY. Modern aspects of Physical Chemistry. Subject matter may include the solid state, electrochemistry, or mathematical methods of Physical Chemistry.

CHM 542. (3) KINETICS AND CHEMICAL STATISTICS. Phenomenological and mathematical characterization of kinetic systems. A treatment of ensembles and their partition functions with applications to solid, liquid and vapor states. Bose-Einstein and Fermi-Dirac statistics will be developed.

CHM 543. (3) CHEMICAL THERMODYNAMICS. First, second, and third laws will be covered to develop free-energy functions for use in chemical equilibrium.

CHM 544. (3) COORDINATION CHEMISTRY. A course dealing in recent developments in the Chemistry of coordination compounds. Special emphasis will be placed on ligand field theory, substitution processes, and ligand stabilization of metal ions.

CHM 545. (3) INORGANIC REACTIONS AND STRUCTURE. A survey of modern inorganic chemistry including non-aqueous solvents, trends in the periodic table, acid base theory, and reaction mechanisms.

CHM 546. (3) SPECIAL TOPICS IN MODERN ANALYTICAL CHEMISTRY. Modern analytical methods. Subject matter may include NMR, EPR, electroanalytical methods, GLC, mass spectroscopy, neutron activation analysis, IR, visible and UV methods.

CHM 547. (3) BONDING IN INORGANIC COMPOUNDS. Topics will include atomic theory; bonding theories, especially molecular orbital theory; the ionic model; band theory of metals; and the structure of solids. Prerequisite: Quantum Chemistry.

CHM 548. (3) ADVANCED ORGANIC CHEMISTRY I. A course dealing with nucleophilic substitution, B elimination, and condensation reactions, free radicals, carbanions, acidities, and linear free energy relationships.

CHM 549. (3) ADVANCED ORGANIC CHEMISTRY II. Topics discussed include the Chemistry of multiple bond systems, resonance aromaticity, electrocyclic additions, carbenes, oxidation reduction, electrophilic substitution and addition reactions.

CHM 550. (3) SPECIAL TOPICS IN ORGANIC CHEMISTRY. Modern physical organic chemistry, spectroscopy, photochemistry, molecular rearrangements, stereochemistry and natural products.

CHM 551. (3) GENERAL BIOCHEMISTRY I. Subject matter will include the chemistry of proteins, carbohydrates, lipids and nucleic acids. The metabolism of these compounds is related to bioenergetics, membranes, enzymes, and certain disease processes. Prerequisite: Chm 314 or 316 and 302 or special permission of the instructor.

CHM 552. (3) GENERAL BIOCHEMISTRY II. Topics will include electron transport and oxidative phosphorylation, lipid metabolism, nitrogen metabolism, nucleic acid and protein synthesis, biochemical genetics, regulation, hormones and nutrition. Prerequisites: Chm 551.

CHM 553. (3) TOPICS IN BIOCHEMISTRY. Topics of current interest in biochemistry will be discussed. Prerequisite: Chm 551, 552 or permission of instructor.

CHM 554. (1-3) DIRECTED READINGS.

CHM 555. (1-3) SPECIAL TOPICS IN CLINICAL CHEMISTRY. Topics of current interest in clinical chemistry will be discussed.

CHM 557. (1) APPLICATIONS OF CLINICAL CHEMISTRY I. A one hour course that will emphasize the relationship between medical practice and clinical chemistry. Each class period will be devoted to the thorough study of selected hospital cases related to a single disorder. Physicians in charge of the cases will present the medical aspects. The laboratory work, and specific problems involved in the laboratory will then be presented by a clinical chemist. The final phase of the class will be an open discussion.

CHM 558. (1) APPLICATIONS OF CLINICAL CHEMISTRY II. A continuation of Chemistry 557.

CHM 559. (3) CLINICAL CHEMISTRY LABORATORY. Clinical Chemistry Laboratory is three 3-hour laboratory periods a week for one semester. This course will serve as an introduction to the instrumentation and language of clinical chemistry laboratories. The laboratory work will include basic procedures, techniques, reagents, instrumentation, and introduce the concept of quality control. Students will perform procedures used in representative modern clinical laboratories for routine analyses and special tests.

CHM 560-561. (3 each term) RESEARCH. The following courses are offered by the Department of Chemistry in cooperation with other departments and schools of the University. These course offerings are not applicable to the Master's Degree in Chemistry.

CHM 501. (3) PRINCIPLES OF CHEMISTRY I. The subjects treated in this course are: atomic structure, chemical bonding, chemical equilibrium, inorganic nomenclature, theory of solutions, acid-base concepts, periodic properties of the elements, radiochemistry and nuclear reactions. Prerequisite: One year of College Chemistry.

CHM 502. (3) PRINCIPLES OF CHEMISTRY II. The subjects treated in this course are: thermodynamics, chemical kinetics, redox reactions, organic chemistry (nomenclature, functional groups, preparation and properties or organic compounds). Prerequisite: Chm 501.

CHM 525-526. (3 each term) PRINCIPLES OF ORGANIC CHEMISTRY. An introduction to the fundamentals of Organic Chemistry. Prerequisite: Chm 124.

CHM 525L-526L. (1) PRINCIPLES OF ORGANIC CHEMISTRY. Laboratory course to accompany Chm 525-526. One three-hour lab per week.

CHM 527-528. (3 each term) THEORETICAL PRINCIPLES OF CHEMISTRY. Prerequisite: Chm 126L or equivalent. Corequisite: Mth 218.

CHM 527L-528L. (1) THEORETICAL PRINCIPLES OF CHEMISTRY. Laboratory course to accompany Chm 527-528. One three-hour lab per week.

CHM 529. (3) INORGANIC CHEMISTRY. The nature of the chemical bond, periodicity, electron distribution in atoms, coordination compounds, the nucleus and its reactions. Prerequisite: Chm 303-304.

CHM 530. (3) PHYSICAL CHEMISTRY. A concise treatment of Theoretical Chemistry. Prerequisite: Chm 124.

CHM 531. (1) IDENTIFICATION OF ORGANIC COMPOUNDS. An analytical course, applying functional groups, physical properties and instrumental methods to the identification of organic compounds. Prerequisite: Chm 315-316.

CHM 531L. (2) IDENTIFICATION OF ORGANIC COMPOUNDS. Laboratory course to accompany Chm 531. Two three-hour labs per week.

CHM. 532. (3) SPECIAL TOPICS IN THEORETICAL CHEMISTRY. A treatment of special topics surveyed in Chm 527-528. Prerequisite: Chm 304.

CHM 533. (3) INTERMEDIATE ORGANIC CHEMISTRY. Modern theory of Organic Chemistry and reaction mechanisms. Prerequisite: Chm 215 or equivalent.

Communication Arts (COM)

George C. Biersack, *Chairman*

COM 506. (3) ETHICS OF COMMUNICATION. An investigation into the general ethical principles of persuasion and into the special ethics of platform communication, business communications, conference responsibilities, broadcast-journalism reporting, classroom communication, theatric message and forensic behavior. Students will be given an opportunity to investigate in depth one or more of the specific areas of ethical communication.

COM 511. (3) PERSUASION TECHNIQUES. A review of the development of the Classical Tradition of Persuasion from 600 B.C. to the present. The principles of Classical Rhetoric based upon the theories of Aristotle, Cicero, and Quintilian are examined in order to determine their effect upon modern theories and techniques in oral communication. A comprehensive analysis of the modern approach to persuasion will be supplemented by research projects in the area of business and industry.

COM 516. (3) BARRIERS TO EFFECTIVE COMMUNICATION. Examination of those circumstances that prevent effective communication in all areas of personal and group relationships. Consideration will be given to misunderstanding arising from the problems of language, semantics, and the lack of factual knowledge. These elements and their misuse will be studied in such situations as private conversation, business, industrial management, interdepartment communications, and politics.

COM 521. (3) THE INVESTIGATION OF LISTENING PROBLEMS. Studies dealing with the importance and complexities of listening. A comprehensive study of the place of listening in our society and its direct relationship to the various forms of communication. Investigation will be made into an analysis of the many related skills involved in effective listening and to the reasons for poor listening habits. Research will be pursued to demonstrate how listening can be improved along with specific procedures for refining the skills necessary for good reception.

COM 526. (3) STUDIES IN COMMUNICATION SKILLS. This course, for senior majors in Communication Arts and Graduate students, is designed to develop and implement the basic skills in oral communication. It stresses comprehensive study of the nature and types of speech situations in the business and professional areas such as the interview, group discussions, the technique of mediation, goodwill and the after-dinner situations. Particular stress will be placed upon the composition and development of lecture length speeches.

COM 530. (3) DEVELOPMENT OF MASS MEDIA. History and analysis of the development and interdependence of Mass Media, print and electronic. Emphasis on its role in political and economic progress of U.S. and attendent responsibility.

COM 531. (6) PROBLEMS SEMINAR. This seminar is designed to offer the student an opportunity to gain practical experience that will supplement his theoretical background. Arrangements will be made for an internship position in a particular business or industry or a specialized area in Communication Arts such as Public Address, Forensics, Radio, and/or Television. The student will submit progress reports as assigned in the seminar sessions. The director of the seminar will collaborate with the director of the internhip program within the specialized area. May be repeated with change in problem and faculty member.

COM 536. (3) COMMUNICATION THEORY. An in-depth survey of the area of Communication Arts with emphasis on approaches and contributions of major universities. Identification of important personalities and professional literature. The student will be required to demonstrate oral and written proficiency of a research project. Investigation of contemporary communication design methods in organizational structures with emphasis on scholastic and experimental approaches.

COM 555. (3) PUBLIC RELATIONS WORKSHOP. Application of policy objectives to public relation program development. Students plan and carry out a public relation program for an established organization, working out realistic and efficient solutions to communication and public relation problems. Case studies in public relations in business and industry, social institutions including school and community relations, and in governmental public relation policy.

COM 561. (3) RHETORICAL CRITICISM. Comprehensive study in Classical and Contemporary Rhetorical theory and criticism; study of the contributions of the classicists and modern scholars of Rhetoric.

COM 566. (3) ARGUMENTATION. An intra-disciplinary approach enabling students to apply the theories and techniques of argumentation and logic with oral proficiency, within the needs of their specific disciplines and professions. From reviewed fundamentals, students progress to in-depth examination of evidence, reasoning, ethics, refutation, and rebuttal with application of formal and inductive logic.

COM 571. (3) HISTORY OF PUBLIC ADDRESS. This course will be basically a survey of great orators and speakers from the period of the Golden Age of Greece through the Roman, Patristic, Medieval, Reformation, and Contemporary Periods in French and British Public Address. It will culminate in a study of American Public Address from early colonial times until the present. An analysis of a highly selective list of great orations and speeches will reinforce the historical and biographical materials.

COM 591. (3) PUBLIC RELATIONS INTERNSHIP. A practical participation in public relations activity with a recognized and approved public relations organization. Selected senior students or graduate students appointed as interns in public relation departments of a business, educational, philanthropic, or governmental agency work a minimum of eight hours per week in supervised activity by agency staff and school faculty. Analytical report evaluating the experience is required at end of internship. Prerequisite Com 555 or permission of Chairman.

COM 598. (3) THESIS.

COM 599. (3) THESIS. Proposal submitted by the Candidate for the M.A. Degree must be approved by the director and his graduate committee.

EQUIVALENT OF THESIS REQUIREMENT (6) The student may select from the following courses his option program: Rhetorical Criticism (3), Argumentation (3), History of Public Address (3), Public Relations Workshop (3), Public Relations Internship (3).

Computer Science (CPS)

Thomas A. Schoen, S.M., *Chairman*

CPS 501. (3) SCIENTIFIC PROGRAMMING. Fortran Programming and applications. Not open to MCS students.

CPS 502. (3) COMPUTING—GENERAL SURVEY. A non-technical introduction to the history and organization of digital computers. Survey of the diverse applications of computers in government, business, education, and the arts. Discussion of the psychological and sociological impact of the computer age. Offered primarily for students in humanities and education.

CPS 504. (3) BUSINESS APPLICATIONS OF COMPUTERS. Applications of computers to the business environment. Programming in COBOL. Offered primarily for MBA students.

CPS 510. (3) SYSTEMS ANALYSIS. Basic system analysis tools; identifying requirements, planning, and measuring effectiveness of computer information systems; system life cycle studies. Prerequisite: programming ability.

CPS 515. (3) ANALOG COMPUTATION AND SIMULATION. Basic principles of analog computation, analog solution of linear and non-linear differential equations, simulation, function generation. Applications to science and engineering. Prerequisite: Differential equations.

CPS 516. (3) PARALLEL HYBRID COMPUTATION. Basic principles of parallel hybrid computers, elementary logic components and their use, combinatorial logic, boolean operations, sequential logic and synchronization. Microprograms. Prerequisite: Analog computation.

CPS 525. (3) SYSTEMS OPTIMIZATION TECHNIQUES. Linear programming, network analysis including pert, game theory, queuing theory, inventory theory, Markov chains, simulation and other topics.

CPS 528. (3) DISCRETE STRUCTURES. Set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of the theory of directed and undirected graphs; boolean algebra and propositional logic.

CPS 532. (3) DATA STRUCTURES. Basic concepts of data; linear lists, strings, arrays, and orthogonal lists; representation of trees and graphs; multilinked structures; symbol tables and searching techniques; sorting techniques.

CPS 536. (3) OPERATING SYSTEM. Study of OS/360 or similar systems and the functions of data, job, and task management.

CPS 544-545. (3) SYSTEMS PROGRAMMING. Analysis of compilers and their construction; programming techniques discussed in the current literature; advanced computer applications in both mathematical and nonnumeric areas. Prerequisite: Data structures, operating system.

CPS 553-554. (6) NUMERICAL METHODS. Solution of nonlinear equations, interpolation and approximation, differentiation and integration, systems of linear equations, eigenvalues, eigenvectors, and introduction to solution of ordinary differential equations. Emphasis placed on applications. Prerequisite: Calculus.

CPS 555-556. (6) NUMERICAL ANALYSIS. Quadrate methods, the numerical solution of ordinary and partial differential equations; matrices and large scale systems, modern iterative matrix methods, minimax approximation, orthogonal functions, and data smoothing. Prerequisite: Linear Algebra.

CPS 577. (3) COMPUTER ORGANIZATION. Minimization of boolean functions, error detecting and error correcting codes, principles of design for arithmetic operations, including a survey of functional units for implementation; memory devices, central processing units, and input/output equipment. Prerequisite: Discrete Structures.

CPS 582. (3) AUTOMATA THEORY. Finite automata, sequential machines, turing machines, computability, existence of self-reproducing machines.

CPS 591. (1-3) SPECIAL RESEARCH PROBLEMS. Individual readings and research in a specialized area (see Cps 592.) May be taken more than once for additional credit. Prerequisite. Permission of the department. By arrangement.

CPS 592. (1-3) SPECIAL TOPICS. Lectures and/or laboratory experience in such specialized areas as those listed below. May be taken more than once for additional credit. Prerequisite: Permission of the department. By arrangement.

1. Artificial Intelligence
2. Computer Architecture
3. Information Retrieval
4. Linguistic Analysis
5. Logical Design
6. Microprogramming
7. Numerical Analysis
8. Programming Languages
9. Sequential Machines
10. Simulation Languages
11. Supervisory Systems
12. Utility Programs

Education

Dr. Ellis A. Joseph, *Dean*

Foundations of Education (EDF)

Dr. M. Audrey Bourgeois, *Chairman*

EDF 501. (4 Qtr. Hrs.) ADVANCED PHILOSOPHY OF LEARNING. A conscious effort to relate learning theories and current issues in the psychology of learning to major aspects of growth and development.

EDF 502. (4 Qtr. Hrs.) ADVANCED PHILOSOPHY OF EDUCATION. Through an in depth analysis of underlying educational assumptions of philosophers, educators, and agencies of society, the course attempts to aid the student in developing a coherent and consistent philosophy of education.

EDF 503. (4 Qtr. Hrs.) RESEARCH METHODOLOGY AND STATISTICS. Designed to develop an understanding of the nature of research: methods, research techniques, sources, evaluation of research studies, basic statistics. Students have the opportunity of developing under guidance research in the area of personal interest.

EDF 504. (4 Qtr. Hrs.) ADVANCED CHILD AND ADOLESCENT PSYCHOLOGY. Deals with the principal areas of growth and development through adolescence with special emphasis on mental development.

EDF 518. (4 Qtr. Hrs.) CULTURAL FOUNDATIONS: SCHOOL AND THE SOCIAL ORDER. The relationship of the school to the total cultural pattern and the development of interaction between school and community are appraised and concrete suggestions are presented. The nature of the individual child and his relations with society and culture; the special culture of the school and its accompanying social world; school, teacher, and community relations.

EDF 550. (4 Qtr. Hrs.) HISTORY OF HIGHER EDUCATION IN THE UNITED STATES. A study of the growth and development of American colleges and universities: multiplication and variety; methods of instruction; aims; administration; innovations and conflicts; values of students, faculty and administrators; public opinion.

EDF 590. (4 Qtr. Hrs.) EDUCATIONAL RESEARCH DESIGN. This course has two major emphases: Part I is devoted to basic processes of scientific inquiry into educational problems; Part II is devoted to selected techniques which stress in greater detail on specific methodological problems.

EDF 593. (4 Qtr. Hrs.) INTERPRETATION OF STATISTICS AND RESEARCH. The emphasis of this course is placed upon descriptive and inferential statistics. Descriptive statistics are used to describe observations of groups of individuals. Inferential statistics are used to make inferences about the total parameters in terms of observed samples and to draw valid inferences and interpretations.

EDF 596-597. (18 Qtr. Hrs.) INTERNSHIP IN EDUCATIONAL RESEARCH. Investigation of the literature of educational research; experiences in developing research design; applications of data processing; conduct of major research activity. Area schools are used as a focus of operations.

EDI 554. (4 Qtr. Hrs.) INDEPENDENT STUDY IN CULTURAL FOUNDATIONS: HISTORY OF EDUCATION IN THE UNITED STATES... A view of the progress of education in the United States as it grew from a colony of Great Britain to an independent world power. Traces education from the rise of the "Common" School to education as an international influence. Considers the educational system within the social, cultural, religious, and political milieu. Notes the influences of industry, finance, technology, progressivism, accreditation, etc.

EDI 578. (4 Qtr. Hrs.) INDEPENDENT STUDY IN CULTURAL FOUNDATIONS: POLITICS OF EDUCATION. An analysis of present day public and nonpublic elementary, secondary, and higher educational policies as they are influenced by the political process. The course will describe and explain educational policies, financial allocations, etc., decided through the national, state, and local political levels; the political participants seeking to influence educational policies, financial allocations, etc.; the general environmental influences and "rules" governing outcomes.

EDI 579. (4 Qtr. Hrs.) INDEPENDENT STUDY IN CULTURAL FOUNDATIONS: COMPARATIVE EDUCATION. Emphasizes that an educational system partakes of and is an integral part of a country's general culture. The educational system of selected model countries of the world will be studied and appropriate comparisons made. Students will choose one country's culture and education for their concentrated and in-depth research.

EDI 591. (4-6 Qtr. Hrs.) RESEARCH PROJECT. Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of EDF 503, Research Methodology and Statistics, and approval of Preliminary Plan.

Counselor Education and Human Services (EDC)

Dr. Eugene K. Moulin, *Chairman*

EDC 522. (3 Qtr. Hrs.) PRINCIPLES AND TECHNIQUES OF GUIDANCE. An introduction to the scope, aims, and techniques of guidance; an introductory treatment of the basic guidance services and how the counselor and the teacher can make efficient use of them.

EDC 524. (3 Qtr. Hrs.) EDUCATIONAL AND OCCUPATIONAL INFORMATION. Selection, utilization, and evaluation of educational and occupational information materials; familiarization with standard labor market data, current requirements for admission into college curricula, and available sources of placement; a usable knowledge of printed and personal reference sources in these fields.

EDC 525. (3 Qtr. Hrs.) USE OF COMMUNITY RESOURCES IN GUIDANCE. Familiarization with availability of services in appraisal, guidance; local information and placement (methods of procedure and cooperation with medical, pastoral, social welfare, mental, educational, industrial, labor, commercial, governmental and recreational agencies).

EDC 528. (3 Qtr. Hrs.) CAREER EDUCATION. The purpose of the career education course is twofold. First, to assist teachers, counselors, administrators and social agency personnel to improve their career education functions with children and youth through the implementation of a coordinated and concerted effort of occupational guidance integrated within the total elementary and secondary school curriculum. Second, to increase the educational vocational self awareness and value clarity of these various professionals as they are related to the career development context.

EDC 530. (4 Qtr. Hrs.) PSYCHOLOGY OF INDIVIDUAL DIFFERENCES. Nature, extent, and significance of variability; hereditary and cultural influences; theories of intelligence; trait organization; group differences.

EDC 531. (4 Qtr. Hrs.) DYNAMICS OF PERSONALITY. Personality theory and abnormal psychology are discussed with emphasis on dynamics of personal behavior.

EDC 532. (4 Qtr. Hrs.) LEARNING DISABILITIES. Etiological, diagnostic, theoretical, remedial factors and practical application to learning disabilities are described.

EDC 533. (3 Qtr. Hrs.) PSYCHOMETRICS. Lectures and demonstrations in the principles and application of psychological measurement, with particular emphasis on standardized group tests of intelligence and scholastic achievement, interest tests, personality tests, and other areas pertinent to the graduate function. Practicum in test selection, use, and interpretation.

EDC 534. (3 Qtr. Hrs.) INDIVIDUAL PSYCHOLOGICAL EVALUATION OF EXCEPTIONAL CHILDREN. The implications of individual developmental and psychological evaluation of exceptional children for classroom management, instructional materials, and teaching methodology. The course is designed principally for counselors, school psychologists and teachers and provides laboratory experience in administering the Illinois Test of Psycholinguistic Abilities and the Gesell Developmental Scale. Direct application will be made to teaching children experiencing developmental immaturity or learning disabilities.

EDC 535. (3 Qtr. Hrs.) PRACTICUM I: TEST INTERPRETATIONS AND CASE STUDIES. Supervised experiences in typical school guidance policies and practices. Such experience will include: vocational guidance, educational guidance and curriculum structures, cumulative folder, test and profile interpretations.

EDC 536W. (2 Qtr. Hrs.) CONFLICT IN THE CLASSROOM: THE EDUCATION OF CHILDREN WITH PROBLEMS. The purpose of this workshop is to assist teachers, counselors and administrators to understand more fully and to improve their function as educators of "children in conflict." Consulting specialists, qualified and capable of implementing a cohesive and coordinated effort, will work with participants in their efforts to explore techniques, approaches, and school and community programs which more appropriately respond to the academic and personal needs of children with problems.

EDC 539. (3 Qtr. Hrs.) ADMINISTRATION OF PUPIL PERSONNEL SERVICES. The course deals with the effective planning, developing, and administering of a totally balanced and co-ordinated program of pupil personnel services.

EDC 543. (4 Qtr. Hrs.) COUNSELING THEORIES. Participants will be assisted in developing skills in counseling through an analysis of five models (Relationship, Behavioral, Social Psychological, Reality Model, and Rational-Cognitive) for the behavior change process. It is hoped that these five models may provide an integrated approach for modifying the behavior of children and adults through individual and system change.

EDC 545. (4 Qtr. Hrs.) PRACTICUM II: COUNSELING TECHNIQUES. Supervised experience in counseling, using role-playing and actual counseling cases. Both group and individualized instruction and supervision. Prerequisites: EDC 524, 533, 543.

EDC 551. (3 Qtr. Hrs.) PERSONNEL SERVICES IN HIGHER EDUCATION. A study of personnel services in higher education; development and principles, theory and practice of administration, trends and research.

EDC 552. (2 Qtr. Hrs.) SEMINAR: COLLEGE PERSONNEL SERVICE PROBLEMS. This course is integrated with the internship in College Personnel Service and is pursued over two trimesters in one quarter hour segments. Problems encountered during the internship and present-day problems of campus life are treated.

EDC 553. (9 Qtr. Hrs.) INTERNSHIP IN COLLEGE PERSONNEL SERVICES. A three-trimester experience in three college personnel services under the instruction and supervision of staff members of the same services working closely with the coordinator of College Personnel Work. Pursued in three quarter hour segments.

EDC 572. (3 Qtr. Hrs.) THE SCHOOL PSYCHOLOGIST: ROLE AND FUNCTION. Selected topics of current significance in the profession of school psychology, with special emphasis on ethics, interpersonal relationships in the school and community, research methodology and current practices in the field.

EDC 573. (6 Qtr. Hrs.) OBSERVATION AND PARTICIPATION IN THE SCHOOL PROCESS. Directed observation of and participation in the normal school process under supervision within the school setting. Required of all school psychologist candidates who do not have teaching certificates.

EDC 574. (1-6 Qtr. Hrs.) INDEPENDENT STUDIES IN PUPIL PERSONNEL SERVICES. Independent study undertaken with permission of the chairman.

EDC 576. (4 Qtr. Hrs.) CHILD AND ADOLESCENT PERSONALITY EVALUATION I. History and objectives of intelligence testing. Methods utilized in the construction of intelligence tests. Intensive experience in administering the Wechsler, Binet, and Illinois Test of Psycholinguistic Abilities. (For students on the School Psychology Program).

EDC 577. (4 Qtr. Hrs.) CHILD AND ADOLESCENT PERSONALITY EVALUATION II. History and rationale of projective tests. Instruction in the administration and use of the Rorschach, Bender Gestalt, TAT, and such other projectives commonly used by the school psychologist. Laboratory experience is provided. (For students on the School Psychology Program)

EDC 580. (3 Qtr. Hrs.) GUIDANCE IN THE ELEMENTARY SCHOOL. A study of the most important concepts and techniques of guidance, with emphasis on the functions and responsibilities of the elementary teacher and counselor.

EDC 581. (4 Qtr. Hrs.) COUNSELING IN THE ELEMENTARY SCHOOL. An introduction to the principles and techniques of counseling elementary school children.

EDC 583. (4 Qtr. Hrs.) GROUP PROCESS. This course has two purposes: (1) to enable the counselor to work effectively with groups; and (2) to achieve the formation of deeper counselor self-understanding by actually participating in the group process. (One quarter of class time is devoted to lectures and three quarters to participation.)

EDC 594-595. (16 Qtr. Hrs.) INTERNSHIP FOR SCHOOL PSYCHOLOGISTS. A job-related program for nine months under the immediate supervision of a trained school psychologist. The internist will be given a stipend, made available from the State of Ohio Foundation funds.

EDC 599. (4-12 Qtr. Hrs.) INTERNSHIP EXPERIENCES IN PUPIL PERSONNEL SERVICES. Designed to assist graduate students in pupil personnel service to improve their professional functions through directed, extensive experiences within new kinds of cooperating schools and community organizations. Prerequisite: Permission, Chairman of Department of Counselor Education and Human Services. May be repeated three times for a total of twelve quarter hours.

EDI 591. (4 Qtr. Hrs.) RESEARCH PROJECT. Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of EDF 503, Research Methodology and Statistics, and approval of Preliminary Plan.

Educational Administration (EDA)

Dr. John R. O'Donnell, *Chairman*

EDA 506. (4 Qtr. Hrs.) SCHOOL ADMINISTRATION. General principles governing the administrative functions of planning, organizing, and controlling are presented and applications are made in the administration of both elementary schools and secondary schools.

EDA 507. (4 Qtr. Hrs.) PLANNED FIELD EXPERIENCE. The internship is intended to give educational administration majors opportunities to associate with people in various administrative positions in both public and parochial school systems for the purpose of becoming aware of on-the-job problems, duties, responsibilities, and challenges. Students are urged to have a variety of experiences and must submit written evaluations for each experience. Prerequisite: The advisor's approval of a planned series of internship experiences in various areas of educational administration. The student will develop his planned series of experiences with the assistance of an advisor.

EDA 509. (4 Qtr. Hrs.) SCHOOL SUPERVISION. A course in planning, organizing and administering instructional supervision in public and private (parochial) school systems. Field observation required.

EDA 511. (4 Qtr. Hrs.) ELEMENTARY SCHOOL CURRICULUM. A fundamental course in curriculum development designed to prepare the student for effective participation in cooperative efforts to improve the curriculum. Attention is directed to curriculum issues and to desirable instructional practices in the major areas of curriculum.

EDA 512. (4 Qtr. Hrs.) SECONDARY SCHOOL CURRICULUM. A fundamental course in curriculum development designed to prepare the student for effective participation in cooperative efforts to improve the curriculum. Attention is directed to curriculum issues and to desirable instructional practices in the major curriculum areas.

EDA 513. (4 Qtr. Hrs.) EVALUATION OF EDUCATIONAL AND ORGANIZATIONAL SYSTEMS. Criteria for selecting and assessing sources of educational information. Supervised experience in finding, interpreting and evaluating information needed to make appropriate decisions related to educational and organizational decisions. Specific attention given to evaluation of programs, preparation of proposals and techniques for using evaluation to promote change.

EDA 514. (1-3 Qtr. Hrs.) INDIVIDUAL STUDY IN ADMINISTRATION. Opportunity for individual to study a problem which has relevance to his or her specific educational position. Extent of the study and requirements in the course will be related to the quarter hours requested by the student.

EDA 515. (4 Qtr. Hrs.) SCHOOL LAW. Problems in school administration which may give rise to court action.

EDA 516. (4 Qtr. Hrs.) SCHOOL PLANT. The course will cover types of school facilities, considerations in working with architects, remodeling and new construction, site selection, government financing, space utilization, and other aspects dealing with the overall educational plant.

EDA 517. (4 Qtr. Hrs.) SCHOOL FINANCE. A course for school administrators covering principles of school finance, technical problems of budgeting, source of income, purchasing, accounting, and debt service.

EDA 521. (4 Qtr. Hrs.) SCHOOL PUBLIC RELATIONS. Covers philosophy and techniques of school-community relations for educational leaders. Attention given to parent contacts, citizens' participation, press, radio, television, printed material and other media.

EDA 526. (4 Qtr. Hrs.) EDUCATIONAL STAFF PERSONNEL ADMINISTRATION. An exploration of the various aspects of selection, evaluation, and utilization of staff personnel in relation to the overall educational program.

EDA 585. (4 Qtr. Hrs.) ORGANIZATIONAL SYSTEMS. The application of systems theory to the operation of governmental, business, and educational organizations. Conventional theories are related to the systems approach to an understanding of organizations.

EDI 591. (4 Qtr Hrs.) RESEARCH PROJECT. Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration; Completion of EDF 503, Research Methodology and Statistics, and approval of Preliminary Plan.

Elementary Education (EDE)

Dr. Simon J. Chavez, *Chairman*

EDE 500. (4 Qtr. Hrs.) MATHEMATICS IN THE ELEMENTARY SCHOOL. A graduate course (or workshop) designed for teachers and school supervisors of the Modern Arithmetic Program. Demonstration of how the logical patterns of mathematical thought which are inherent in arithmetic can be readily acquired by pupils.

EDE 557. (4 Qtr. Hrs.) LIBRARY MATERIALS FOR CHILDREN AND ADOLESCENTS. The study and evaluation of literature and other library materials for children and adolescents. Emphasis on familiarization and evaluative criteria.

EDE 558. (1-4 Qtr. Hrs.) INDEPENDENT STUDY. Independent study in a specific area, such as reading, mathematics, social studies. Individually pursued under the direction of a specialist in the appropriate field.

EDE 559. (4 Qtr. Hrs.) RESEARCH AND MATERIALS IN MATHEMATICS INSTRUCTION. A study of research and trends in contemporary mathematics. Particular attention to new materials and to action research.

EDE 560. (4 Qtr. Hrs.) RESEARCH IN SOCIAL STUDIES INSTRUCTION. A study of significant research in social studies instruction at the elementary level. Emphasis on cognitive processes, social and study skills, and evaluation.

EDE 561. (4 Qtr. Hrs.) INTERACTION ANALYSIS. To enable the teacher to increase his awareness of the effect that his teaching behavior has upon pupils; to increase his proficiency in distinguishing between his expectations and the resulting pupil behavior; to become expert in recognizing and overcoming the natural defensive reaction when outcomes in pupil behavior differ from teacher expectations. This course correlates theory of learning with application in classroom teaching.

EDE 562. (4 Qtr. Hrs.) EDUCATIONAL MEDIA. A study of materials, equipment, and technology in Education. Actual use and evaluation in the classroom.

EDE 563. (4 Qtr. Hrs.) SUPERVISION OF STUDENT TEACHING. Demonstration of procedures and use of instruments to determine the student teacher's readiness and to guide his progress. Prerequisites: EDE 561, 562.

EDE 564. (4 Qtr. Hrs.) ADVANCED SCIENCE IN ELEMENTARY SCHOOL. This course or workshop is designed to train elementary school teachers to integrate science with all phases of the curriculum—by research projects in the basic areas of astronomy, biology, chemistry, geology, physics, and air-age education. Teachers also have the opportunity to study and evaluate the visual aids now available in the field of science. Prerequisite: EDE 460, Science in the Elementary School or another college course in physical science.

EDE 565. (4 Qtr. Hrs.) PRACTICUM IN SCIENCE INSTRUCTION. Application of inquiry and discovery approach to the study of biotic communities, geologic formations, and balance of nature.

EDE 566. (4 Qtr. Hrs.) INNOVATIONS AND TRENDS IN LANGUAGE ARTS. A survey of research and trends in Language Arts instruction, particularly in areas of the communication skills, both oral and written.

EDE 567. (4 Qtr. Hrs.) SURVEY OF RESEARCH IN READING INSTRUCTION. A basic course for experienced teachers concerned with the psychology of learning Reading and with current problems and trends.

EDE 568. (4 Qtr. Hrs.) DIAGNOSIS AND CORRECTION OF READING DIFFICULTIES. A study of common causes for Reading disabilities and of types of observation and measurements to be used in identifying disabilities. Practicum in use of machines and materials with individuals and groups.

EDE 569. (4 Qtr. Hrs.) ADVANCED DEVELOPMENTAL READING. The psychological and sociological bases in Reading. Attention to linguistics, materials, skills, and evaluation. The first course in a program designed to prepare specialists in Reading.

EDE 570. (4 Qtr. Hrs.) SUPERVISION AND CURRICULUM IN READING. A study of selected curricula and the processes of planning a sound curriculum in Reading at different levels. It outlines the role of the Reading supervisor, providing guidelines for effective implementation of Reading programs. Prereqisite: EDE 568.

EDE 571. (3 Qtr. Hrs.) PRACTICUM IN READING DIAGNOSIS. This is a laboratory portion of the course EDE 568. It must be taken concurrently with EDE 568. It involves application of reading diagnosis and the teaching of small groups of children.

EDI 591. (4 Qtr. Hrs.) RESEARCH PROJECT. Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of EDF 503, Research Methodology and Statistics, and approval of Preliminary Plan.

Physical and Health Education (EDP)

Mr. James B. LaVanche, *Chairman*
Dr. Doris Drees, *Coordinator of Graduate Studies*

EDP 508. (1-4 Qtr. Hrs.) PHYSICAL EDUCATION WORKSHOPS. Workshops designed for study of special topics of current interest in physical education. Content varies and may focus attention on substantive material or operational problems. May be repeated up to a maximum of four quarter hours.

EDP 510. (3 Qtr. Hrs.) HISTORY OF PHYSICAL EDUCATION. A study of the development of sport and physical education from early cultures to the present time with emphasis upon these areas in the United States.

EDP 519. (3 Qtr. Hrs.) SPORT AND SOCIETY. A study of the cultural patterns, socializing process and other psychosocial parameters of American sport.

EDP 523. (3 Qtr Hrs.) CURRICULUM DEVELOPMENT OF PHYSICAL EDUCATION. Principles and procedures for curriculum construction and revision; criteria for selecting activities and judging outcomes and the place of a Physical Education course of study within the total curriculum.

EDP 529. (3 Qtr. Hrs.) INNOVATIVE PRACTICES IN PHYSICAL EDUCATION. Practical and theoretical study of innovative methods of teaching physical activities.

EDP 537. (4 Qtr. Hrs.) MECHANICAL ANALYSIS OF MOTOR SKILLS. Investigations of physical principles operative in the performance of physical education activities with attempts to analyze for methods of greater effectiveness and improved performance.

EDP 538. (3 Qtr. Hrs.) THE NATURE AND BASIS OF MOTOR SKILL ACQUISITION. A study of psychological factors which affect the acquisition of motor skills. Perceptual-motor development theories are examined with special concern given to motor behavior.

EDP 546. (4 Qtr. Hrs.) SCIENTIFIC PRINCIPLES OF ATHLETIC CONDITIONING. Study of the factors which affect maximum human performance in athletic competition. The knowledge and application of scientific principles in preparing the individual for maximum performance. Methods and theories of training, conditioning and reconditioning.

EDP 547. (3 Qtr. Hrs.) ADMINISTRATION OF INTERSCHOLASTIC AND INTRAMURAL ATHLETICS. Organization of high school athletic and intramural programs, staff, program, budget, health and safety and other phases of administration.

EDP 548. (3 Qtr. Hrs.) HUMAN MOVEMENT THEORIES IN PHYSICAL EDUCATION. Individual and group study of problems and theories related to the scientific variables of human movement.

EDP 555. (3 Qtr. Hrs.) SURVEY OF RESEARCH IN PHYSICAL EDUCATION. Survey and critical analysis of research and other pertinent materials in the field.

EDP 556. (3 Qtr. Hrs.) ISSUES IN PHYSICAL EDUCATION (SEMINAR). A seminar designed to investigate and report on an issue in physical education.

EDP 575. (1-4 Qtr. Hrs.) INDIVIDUAL STUDIES IN PHYSICAL EDUCATION. Individual investigations of a problem in physical education or health. (With approval of advisor)

EDP 579. (3 Qtr. Hrs.) SEMINAR IN HEALTH EDUCATION. A problems course for experienced teachers.

EDP 582. (1-4 Qtr. Hrs.) INTERNSHIP IN PHYSICAL EDUCATION. A job-related experience under the immediate supervision of personnel from a local school or community organization.

EDI 591. (6 Qtr. Hrs.) RESEARCH PROJECT. Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of EDF 503, Research Methodology and Statistics, and approval of Preliminary Plan.

Secondary Education (EDS)

Mr. Robert Kriegbaum, *Acting Chairman*
Dr. Helen Frye, *Coordinator of Graduate Studies*

EDS 527W. (4-5 Qtr. Hrs.) BUSINESS SYSTEMS AND DATA PROCESSING. A graduate workshop in business automation, related procedures, and equipment; designed to develop a program of approach the secondary schools can use in educating students in office automation and business data processing. Explanation of the Business Office Education Program of the Department of Education, State of Ohio, is included. This workshop fulfills

a requirement for BOE certification. Prerequisite High School Certification in Business Education.

EDS 588. (4 Qtr. Hrs.) PERSONAL KNOWLEDGE. This experience focuses upon the understanding and development of subjectivities through personal encounter and reading. Students are encouraged to explore personal meanings which are not discursive, not nomothetic, and not repeatable.

EDS 589. (4-9 Qtr. Hrs.) SEMINAR AND PRACTICUM IN THE STUDY OF LEARNING ENVIRONMENTS. Study and participation in writing behavioral objectives and appropriate evaluation items, in classifying objectives and questions according to cognitive level of student activity, in analyzing classroom verbal communication, in using teaching strategies that will involve students actively in the learning process, and in microteaching.

EDS 598. (15 Qtr. Hrs.) INTERNSHIP IN TEACHING. A full semester of directed teaching experiences under the supervision of a faculty advisor and of selected master teachers in local area schools. Weekly seminars on campus.

Aerospace Engineering (AEE)

Dr. Jay D. Pinson, *Director*

AEE 501. (3) ADVANCED AERODYNAMICS I. Fundamentals of aerodynamics including viscosity and compressibility phenomena for subsonic, supersonic and transonic flow. The emphasis is on force and moment determination for bodies, including theory of lift.

AEE 502. (3) ADVANCED AERODYNAMICS II. Advanced analytical development of viscous and compressible fluid theory as applied to vehicle performance in steady flight, accelerated flight, analysis of vehicle flight paths and trajectories.

AEE 511. (3) AIRCRAFT DESIGN. Preliminary design of aircraft. Includes aircraft layout, weight and size estimates, wing section and planform selection, determination of configuration aerodynamics, engine and inlet sizing, corrections to propulsion data, refined fuel estimates, weight and balance, stability and control, and performance determination.

AEE 521. (3) VEHICLE DYNAMICS. Dynamics of flight vehicles that emphasize the fundamental theory of flight and its application to aerospace systems. Includes static and dynamic stability including the characteristic longitudinal and lateral perturbation motions about the equilibrium state.

AEE 523. (3) AUTOMATIC CONTROL. Basic feedback control theory, transfer functions, stability analysis, Bode plots, Nyquist, root-loci, Routh's criteria. State space methods. Nonlinear systems, phase plane analysis, describing functions, Lyapunov stability analysis. Autopilots, stability augmentation and flight control systems.

AEE 525. (3) SIMULATION THEORY AND PREDICTION. Simulation of modern flight vehicles using hybrid computers; prediction and evaluation of flying qualities; vehicle equations of motion and manual control theory. Flight regimes include low-speed-high angle-of-attack, STOL, transonic and others. Flying qualities. Prediction methods. Mathematical model of human pilot. Experimental prediction using hybrid computer.

AEE 531. (3) PROPULSION. Principles of propulsive devices, aerothermodynamics, diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet, turbo-fan, prop-fan engines, turboprop and turboshaft engines, RAM and SCRAM jet analysis and a brief introduction to related materials and airframe-propulsion interaction.

AEE 532. (3) FUNDAMENTALS OF COMBUSTION. Heat of combustion and flame temperature calculations; rate of chemical reaction and Arrhenius relationship; theory of thermal explosions and the concept of ignition delay and critical mass; phenomena associated with hydrocarbon-air combustion; specific applications of combustion.

AEE 533. (3) COMBUSTION THEORY. Theory of detonation (Rankine-Hugoniot relationships), and flame propagation rate in pre-mixed gas systems; turbulent flames and the well-stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials; ignition and flame spreading across solid materials.

AEE 541. (3) FUNDAMENTALS OF ADVANCED STRUCTURAL MATERIALS. Introduces the anisotropic material and its complex behavior, compares with isotropic material. Establishes the analytical tools for analysis and the design of aerospace structures with laminated composites. Classical laminated plate theory is established as a special case of the more general and complex anisotropic plate theory for practical application reasons.

AEE 542. (3) DESIGN OF ADVANCED STRUCTURES. Structural design of aerospace subsystems and components. Analysis of composites and other advance structures for static and dynamic loads. Methods of optimization for performance and cost. Design criteria prediction for stresses, displacements, instabilities, fatigue fracture.

AEE 543. (3) INTRODUCTION TO AEROELASTICITY. Static method of stability prediction for elastic systems subjected to conservative forces. Dynamic method when forces are nonconservative. Follower forces. Stability of flexible shafts, rotors, centrifuges. Aeroelasticity and wing flutter. Panel and membrane flutter in supersonic flow. Galerkin's method. (Registration restricted to students enrolled in Master of Science in Engineering. Aerospace Engineering option, Program).

AEE 551. (3) VISCOUS FLOW. Fundamentals of viscous flow. Navier-Stokes and boundary layer equations. Exact and approximate solutions of these equations using modern computational procedures for both laminar and turbulent flows. Prerequisite: MTH 403.

AEE 552. (3) POTENTIAL FLOW. Fundamental equations, kinematics and dynamics of fluid flow. Principles of irrotational flow. Conformal representation of two-dimensional flow. Prerequisite: MEE 308; Co-requisite: MTH 404.

AEE 553. (3) COMPRESSIBLE FLOW. Fundamental equations of compressible flow, introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one dimensional motion and shock tube theory. Prerequisite: MEE 418.

AEE 554. (3) TRANSONIC AERODYNAMICS. Inviscid theory related to planer flows, axisymmetric flows and shock free solutions. Viscous consideration for compressible boundary layers and flow separation and reattachment. Numerical methods of relaxation, time dependent, gradient dependent and integral solutions. Consideration, limitation and correlation of wind tunnel and flight testing. Design of supercritical wings.

AEE 555. (3) TURBULENCE. Random variable theory, Fourier transforms, power spectral density methods. Description of atmospheric turbulence, discrete gusts, homogeneous isotropic turbulence; gusts in several dimensions; power spectrum of atmospheric turbulence; turbulence due to trailing vortices, Air vehicle response to turbulence, output power spectrum, gust alleviations. Clear air turbulence. Unsteady aerodynamics.

AEE 556. (3) HYPERSONIC AERODYNAMICS. Hypersonic prediction techniques, similarity rules, Newtonian impact theory, high temperature equilibrium properties of gases; wake characteristics; heat transfer, chemical kinetics and reacting gas flows, simulation and testing techniques.

AEE 561. (3) AIRCRAFT ENVIRONMENTAL CONTROL. The performance analysis of aircraft environmental control systems are presented. Development of steady state and transient equations for system components such as heat exchangers. Psychrometrics as it applies to aircraft air conditioning; turbo-machinery used in reverse Brayton refrigeration cycle; application of heat pipes; overall systems and mission analysis; controls and numerical modeling.

AEE 562. (3) CONDUCTION HEAT TRANSFER. Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics, numerical analysis, and analogic experiments.

AEE 563. (3) CONVECTION HEAT AND MASS TRANSFER. Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, superposition of solutions, eigen-value problems. Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite: MEE 410.

AEE 564. (3) RADIATION HEAT TRANSFER. Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorptivity of gases. Introduction to radiative exchange in gases. Prerequisite: MTH 403.

AEE 571. (3) ENVIRONMENTAL ACOUSTICS AND VIBRACOUSTICS. Physics of sound propagation. Physiological and legal aspects of sound. Measurement and analysis of sound and vibrations. Vibration and sound control techniques, source modifications, path modifications, receiver modifications. Acoustic considerations in machine design. Prerequisite: MTH 219.

AEE 572. (3) MECHANICAL VIBRATIONS. Multi-degree of freedom systems, Lagrange's equations, transient vibrations, vibrations of continuous systems. Matrix and numerical methods. Introduction to finite element method. Introduction to nonlinear vibrations. Prerequisite: MEE 319.

AEE 580. (3) AEROSPACE ENGINEERING PROJECT. Student participation in an aerospace research, design or development project under the direction of a project advisor. To obtain credit, the student must show satisfactory progress in the project as determined by the project advisor and must present a written report at the conclusion of the project.

AEE 590. (1-3) SELECTED READINGS IN AEROSPACE ENGINEERING. Directed readings in the designated area to be arranged and approved by the student's faculty advisor and the program director. This course may be repeated.

AEE 595. (1-6) SPECIAL PROBLEMS IN AEROSPACE ENGINEERING. Special assignments in Aerospace Engineering subject matter to be arranged and approved by the student's faculty advisor and the program director.

AEE 612. (3) ADVANCED APPLIED AERODYNAMICS. Optimization of performance and controls, design trade studies, advanced methods for performance predictions, wind tunnel testing, flight testing, computer system design and simulation; analysis and validation of models and results, including design to cost consideration.

AEE 622. (3) ADVANCED VEHICLE DYNAMICS. Advanced topics in vehicle dynamics including the coupling of the elastic degrees of freedom with the rigid body motions. Also included are topics on response to controls, flight in a turbulent atmosphere, human pilots and handling qualities as well as inverse problems.

AEE 624. (3) OPTIMAL CONTROL. Feedback control, frequency and time domain, stability, controllability, and observability; Bode plots, root-loci, Nyquist method; variational calculus optimization; dynamic programming; Pontryagin's principles; numerical methods for optimal paths; optimal control in presence of noise; aerospace application.

AEE 690. (1-3) SELECTED READINGS IN AEROSPACE ENGINEERING. Directed readings in Aerospace Engineering to be arranged and approved by the student's advisory committee and the program director. This course may be repeated.

AEE 695. (1-3) SPECIAL PROBLEMS IN AEROSPACE ENGINEERING. Special assignments in Aerospace Engineering. Subject matter to be arranged and approved by the student's advisory committee and the program director. This course may be repeated.

AEE 698. (1-15) D. E. DISSERTATION. An original investigation as applied to Aerospace Engineering practice. Results must be of sufficient importance to merit publication.

AEE 699. (1-15) PH.D. DISSERTATION. Research in Aerospace Engineering. Results must be of sufficient importance to merit publication.

Chemical Engineering (CME)

Dr. Michael A. Bobal, *Chairman*

CME 507. (3) ADVANCED THERMODYNAMICS. Applications of the laws of thermodynamics—Phase equilibria in ideal and nonideal systems—Chemical Equilibrium.

CME 508. (3) ADVANCED TOPICS IN CHEMICAL ENGINEERING. Study and discussion of current problems in Chemical Engineering Research. Prerequisites: Cme 521, Cme 581, Cme 582.

CME 521. (3) ADVANCED TRANSPORT PHENOMENA. Applications of the principles of momentum and heat transfer to steady state and transient problems. Potential flow, boundary layer theory. Prerequisite: Cme 581.

CME 522. (3) SEPARATION PROCESSES. A study of mass transfer in Binary and Multicomponent systems. Absorption. Distillation. Extraction.

CME 541. (3) PROCESS DYNAMICS. Application of dynamic analysis techniques to the study of non-steady state chemical processes.

CME 542. (3) CHEMICAL ENGINEERING KINETICS. Theory of absolute reaction rates, mass and heat transfer in catalytic beds.

CME 581. (3) ADVANCED CHEMICAL ENGINEERING CALCULATIONS I. Applications of ordinary and partial differential equations to engineering problems. Classical methods of solution.

CME 582. (3) ADVANCED CHEMICAL ENGINEERING CALCULATIONS II. Analysis and design of processes and the solution of the resulting differential equations by computer techniques.

CME 595. (2-6) SPECIAL PROBLEMS IN CHEMICAL ENGINEERING. Particular assignments to be arranged and approved by the Chairman of the department.

CME 599. (3-6) GRADUATE ENGINEERING THESIS. Students engaged in thesis research must enroll for this course for a total of six credit hours.

Civil Engineering (CIE)

Seymour J. Ryckman, *Chairman*

CIE 500. (3) ADVANCED STRUCTURAL ANALYSIS. Frames of variable cross section, Arches; Flat and Folded Plates; Elastic Stability of columns, frames, and plates; cylindrical, spherical and barrel shells; Structural dynamics of beam and frames. Prerequisites: CIE 406, EGM 304.

CIE 501. (3) STRUCTURAL ANALYSIS BY COMPUTER. Review of force and displacement methods. Introduction to direct element and substructure methods. Students write and execute, using computer terminals, their own programs to analyze plane and space trusses, grids, and plane and space frames. Prerequisite: Cie 406.

CIE 502. (3) PRESTRESSED CONCRETE. Discussion of the properties of concrete and prestressing steel. Theory and design of prestressed concrete beams, slabs, columns, frames, ties, and circular tanks. Prerequisite: Cie 407.

CIE 503. (3) PLASTIC DESIGN IN STEEL. Analysis and design procedures based on ultimate load capacity are applied to steel beams, frames, and their connections. Topics include: concept of plastic hinge, necessary conditions for the existence of plastic moment, instability, deformations, repeated and reversed loading, and minimum weight design. Prerequisite: Cie 415.

CIE 520. (3) ADVANCED SOIL MECHANICS. Treatment of the theories of conventional soil mechanics. Detailed study and analysis of the static and dynamic properties of soils, with applications to foundation behavior. Prerequisite: Cie 312.

CIE 524. (3) FOUNDATION DESIGN. Analysis of earth pressure, stability of natural slopes and bearing capacity of soil: design of spread foundations, pile foundations, beams on elastic foundations, anchored bulkheads, caissons, and cofferdams. Prerequisite: Cie 312.

CIE 540. (3) HIGHWAY GEOMETRIC DESIGN. Design controls and criteria, vehicle capacity, sight distance, intersection and interchange design. Prerequisite: Cie 405.

CIE 544. (3) TRAFFIC ENGINEERING. Characteristics of traffic, including the road user, the vehicle, origin, and destination surveys; traffic regulation, control devices and aids, design, administration and planning. Prerequisite: Cie 405.

CIE 558. (3) TRAFFIC ENGINEERING RESEARCH. Problems in control or capacity restraints based on studies of local situations.

CIE 560. (3) ADVANCED SANITARY ENGINEERING. Stream pollution control and design of water and waste treatment plants and sewers. Prerequisites: Cie 433, Cie 434.

CIE 562. (3) INDUSTRIAL WASTE TREATMENT. Nature and quality of specific industrial wastes and water supplies, treatment and disposal of industrial wastes. Prerequisites: Cie 433, Cie 434.

CIE 580. (3) HYDROLOGY AND SEEPAGE. The deposition, movement and infiltration of water as related to the hydrologic cycle and groundwater hydraulics: a study of the theory of flow in porous media with application to dams, excavations, and other foundation problems. Prerequisites: Cie 307, Cie 312.

CIE 582. (3) ADVANCED HYDRAULICS. Problems and study involving open channel flow, draw down curves, hydraulics of dams, spillway, models, and water distribution systems. Prerequisite: Cie 307.

CIE 595. (2-6) SPECIAL PROBLEMS IN CIVIL ENGINEERING. Subject material in Civil Engineering and assignments to be arranged and approved by the Department Chairman and the Director of Engineering Graduate Programs.

CIE 599. (3-6) THESIS. Thesis topic to be arranged by student with approval of Thesis Advisor. Student must enroll for this course with total credit of 6 credit hours.

Electrical Engineering (ELE)

Dr. Bernhard M. Schmidt, *Chairman*

ELE 502. (3) NETWORK SYNTHESIS. Snythesis of linear passive networks using classical pole-zero techniques; conditions for physical relizability; approximating network functions and design to meet specific requirements; analysis and synthesis of linear active networks. Prerequisites: Ele 332, Ele 413.

ELE 505. (3) QUANTUM ELECTRONICS: PRINCIPLES. Principles of quantum theory; classical and quantum statistics; many-particle systems; electromagnetic interactions with materials. Applications to lasers and Q. M. communication theory. Prerequisite: Ele 440 or equivalent.

ELE 506. (3) SOLID STATE DEVICES. Introduction to the theory of solid state electron devices. Bulk devices, junction devices, devices involving electric, magnetic, optical, and acoustical interactions.

ELE 507. (3) ELECTROMAGNETIC FIELDS I. Fundamental concepts; introduction to waves; theorems of electromagnetics; plane wave function; cylindrical wave functions. Applications to ELE- through—optical-frequency systems. Prerequisite: Ele 334.

ELE 508. (3) ELECTROMAGNETIC FIELDS II. Spherical wave functions; perturbational and variational techniques; radiative systems; microwave networks. Prerequisite: Ele 334.

ELE 509. (3) ANALYSIS OF LINEAR SYSTEMS. A study of Fourier series, finite trigonometric series, Fourier transforms, and their applications in the analysis of linear systems.

ELE 513. (3) COMMUNICATION THEORY. The application of Fourier series and integrals to the analysis of communication problems; theory of random signals, autocorrelation, power density spectra, and optimum filters. Prerequisite: Ele 413.

ELE 514. (3) ANALYSIS OF NON-LINEAR SYSTEMS. An advanced study of methods of analysis of non-linear systems with applications in the fields of electric circuit theory and control systems. Prerequisite: Ele 509.

ELE 515. (3) AUTOMATIC CONTROL THEORY. Analysis and synthesis of feedback control systems; graphical frequency-response techniques; establishing performance criteria; state-space techniques. Prerequisite: Ele 432.

ELE 517. (3) RANDOM PROCESSES IN SYSTEM THEORY I. A coherent, semiformal introduction to the theory of probability and random processes as applied to system theory. Topics to be treated are the axioms of probability; the concept of random variable, distributions, density; function of random variables; stochastic processes; stationary processes; linear mean square estimation: Markov processes. Prerequisite: Ele 331 or consent of instructor.

ELE 518. (3) ESTIMATION THEORY AND ITS APPLICATIONS. A unified approach to the theory of estimation as applied to engineering problems of communication and control. Review of probability and linear dynamical systems, analysis of discrete and continuous linear stochastic systems; frequency and time domain solution of the linear estimation problem: applications to current engineering problems of communication and control. Prerequisite: Ele 517.

ELE 521. (3) CONDUCTORS AND DIELECTRICS. Ionic and metallic conduction; thermoelectric phenomena; conductors for various engineering application; physics of "nonconductors"; ferro-electricity; electrets; piezoelectricity; optical properties; specialty materials. Prerequisite: Ele 505.

ELE 522. (3) MAGNETIC MEASUREMENTS AND INSTRUMENTS. Magnetic material properties; quantities and units. Field generation; measurement of field strength, magnetic moment and induction. A.C. permeability, iron losses, waveforms. Permanent magnet properties. Static and dynamic hysteresis loops. Magnetic domain observation. Thermomagnetic analysis. Two weekly lecture hours and five laboratory sessions of 4 hours each. Prerequisite: Ele 524 or consent of instructor.

ELE 523. (4) PERMANENT MAGNETS. Basic properties and description. Magnetic circuit design. Magnet material types and properties. Physics and metallurgy of permanent magnets. Property measurement. Engineering applications. Present research activities. Three weekly lecture hours and five laboratory sessions of 4 hours each, field trip to magnet manufacturer. Prerequisite: Ele 524 or consent of instructor.

ELE 524. (3) MAGNETIC MATERIALS: PHYSICAL PRINCIPLES. Description of magnetic material properties. The magnetic circuit. Atomic magnetism. Types of magnetic order and spin structures. Intrinsic magnetization. Molecular field concept. Anisotropy. Magnetostriction. Magnetic resonances. Prerequisite: Ele 333 or consent of instructor.

ELE 525. (3) MAGNETIC MATERIALS FOR ENGINEERING APPLICATIONS. Magnetic domains. Technical magnetization and domain structure. A.C. properties, losses, eddy currents. Causes of coercivity. Metallic and ceramic materials for transformers, electrical machinery, permanent magnets, HF devices, data recording, computer memories, etc. Metallurgy and crystallography of magnetic materials. Prerequisite: Ele 524, or consent of instructor. NOTE: Simultaneous attendance at Ele 525S is recommended.

ELE 525S. (1) MAGNETIC MATERIALS PROSEMINAR. Student seminar to complement Ele 525. Corequisite Ele 525.

ELE 526. (2) APPLIED SUPERCONDUCTIVITY. Basic phenomena. Theoretical concepts. Superconducting materials-types, properties, physics, metallurgy. Superconducting magnets. Other current and future engineering applications. (Consent of Instructor)

ELE 527. (3) RANDOM PROCESSES IN SYSTEM THEORY II. A continuation of Ele 517, Random Processes in System Theory I, with emphasis on Markov Processes and Random Dynamical Systems. Prerequisite: Ele 517.

ELE 531. (3) DIGITAL SYSTEMS THEORY I. Switching Circuit Theory: Number systems, truth functions, Boolean algebra, switching devices, codes, relay circuits, and an introduction to sequential circuits. Prerequisite: Ele 313 or consent of instructor.

ELE 532. (3) DIGITAL SYSTEMS THEORY II. Sequential Circuit Theory: Clocked sequential circuits, incompletely specified sequential circuits, pulse-mode circuits, fundamental mode circuits. Prerequisite: Ele 531.

ELE 533. (3) DIGITAL SYSTEMS THEORY III. Digital Computer Design: Digital arithmetic, switching matrices, digital computer elements, arithmetic and control units, the logic design of a simple digital computer. Prerequisite: Ele 532.

ELE 534. (3) DIGITAL SYSTEMS THEORY IV. Advanced Sequential Machine Theory: Finite—state machines, regular expressions, lossless machines, bilateral analysis and synthesis procedures, sequential iterative systems. Prerequisite: Ele 532.

ELE 535. (3) CODING THEORY. The theory of error-correcting, error-detecting codes as applied to the design of reliable digital data systems. Prerequisite: Ele 532.

ELE 541. (3) POWER ELECTRONICS. Applications of power semiconductors to power conversion, control amplification, and regulation. The applications are studied in the light of an integrated, quantitative treatment of mechanical, thermal, and electrical characteristics and ratings; modeling for linear, nonlinear and switching modes; and thermal and electric circuit interactions. Prerequisite: Ele 313 or equivalent.

ELE 551. (3) ELECTRICAL POWER SYSTEM DYNAMICS. Basic structure of the electrical power transmission system; criteria for system stability; symmetrical components; synchronous machine equations of motion, transients and dynamics; transmission line surges, short circuit calculations. Prerequisites: Ele 334, Ele 431.

ELE 555. (3) SYSTEM DYNAMICS I. The methodology for modeling the dynamics of complex social-economic systems is developed. The use of these models to study organizational policies and design for higher order multiple-loop, nonlinear feedback structures is considered in detail.

ELE 595. (2-6) SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Particular assignments to be arranged and approved by the chairman of the department.

ELE 599. (3-6) THESIS. Students engaged in thesis research must enroll for this course for a total of six credit hours.

ELE 602. (2) MAGNETIC EXCHANGE INTERACTION THEORIES. Molecular field theory of ferro-ferri-and anti-ferromagnets. Direct, indirect and super-exchange interactions. Localized-ion vs. band-model theories. Complex magnetic spin structures. The course will emphasize physical concepts rather than detailed mathematical development. Prerequisite: Ele 524 or consent of instructor.

ELE 603. (2) MAGNETIC ANISOTROPY AND MAGNETOSTRICTION. Mathematical description of magnetic anisotropy and magneto-elastic phenomena. Physical causes of magneto-crystalline anisotropy and magnetostriction. Relationship to theory of magnetic exchange. Prerequisite: Ele 524 or consent of instructor.

ELE 626. (3) SYSTEM DYNAMICS II. The continuation of System Dynamics I with special emphasis on the study of large scale corporate, urban, educational, and ecological systems. Prerequisite: Ele 555.

ELE 690. (1-3) SELECTED READINGS IN ELECTRICAL ENGINEERING. Directed readings in electrical engineering areas to be arranged and approved by the chairman of the student's advisory committee and the department chairman. May be taken more than once.

ELE 695. (1-3) SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. Special electrical engineering topics not covered in regular electrical engineering courses. Course sections arranged and approved by chairman of the student's advisory committee and the department chairman. May be taken more than once.

ELE 698. (1-15) D. E. DISSERTATION. An original investigation as applied to electrical engineering practice. Results must be of sufficient importance to merit publication.

ELE 699. (1-15) PH.D. DISSERTATION. An original research effort in electrical engineering which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Engineering Management (ENM)

Dr. Landis S. Gephart, *Director*

ENM 501. (3) ANALYSIS OF ENGINEERING DATA. A study of utility theory and decision making under certainty, risk, and uncertainty. Also application of Bayesian analysis to multistage decision problems. Includes the application of these techniques to various engineering and industrial problems.

ENM 502. (3) SIMULATION TECHNIQUES IN OPERATIONS RESEARCH. The construction of models which simulate real systems, the use of random numbers in obtaining sample observation of the model, and the inference of system properties from samples of observations of the model.

ENM 508. (3) QUALITY CONTROL. Principles and applications of the latest quality control procedures. Design of quality control systems and procedures. Recent developments in statistical quality control such as multi-level continuous acceptance sampling, variable sampling, and life testing.

ENM 515. (3) QUEUING THEORY AND APPLICATION. Emphasizes application of theory to Industrial Engineering. Topics include matching interference, mathematical queuing models, a study of case histories (with solutions) including marketing models, servicing problems, Markovian models. Includes Monte Carlo techniques and computer simulation models.

ENM 516. (3) INVENTORY THEORY AND APPLICATION. Theory and application of inventory control with respect to costs of ordering and manufacturing, holding and storage, shortage-penalty costs, revenues, and discount rates. Topics include: forecasting, material control, input capacity and scheduling, stochastic inventory models, dynamic inventory models including real time computerized inventory control models.

ENM 517. (3) RANDOM PROCESSES IN SYSTEM THEORY I. A coherent, semiformal introduction to the theory of probability and random processes as applied to system theory. Topics to be treated are the axioms of probability; the concept of random variable, distributions, density; function of random variable; expectation and Labesque Integration; sequences of random variables; stochastic processes; linear mean square estimation; Markov processes: Prerequisite: Ele 322 and working knowledge of LaPlace transforms or consent of instructor.

ENM 518. (3) ESTIMATION THEORY AND ITS APPLICATION. A unified approach to the theory of estimation as applied to engineering problems of communication and control. Review of probability and linear dynamical systems, analysis of discrete and continuous linear stochastic systems; frequency and time domain solution of the linear estimation problem; applications to current engineering problems of communication and control. Prerequisite: Enm 517.

ENM 521-522. (6) OPERATIONS RESEARCH. Study of methods of operations research, including formulating problems, weighing the objectives, construction of models, deriving solutions, testing the models and implementing results. Emphasis upon applications of operations research to industrial problems.

ENM 524. (3) DISCRETE TIME SERIES. Emphasis is placed on Industrial applications of open loop statistical forecasts. Techniques of describing a time series by very general classes of functions are studied. These include but are not limited to trigonometric functions that make it possible to describe any cyclical process accurately and easily.

ENM 525. (3) SYSTEM RELIABILITY AND MAINTAINABILITY. Application of probability and statistical theory to the design of reliability systems in the broadest sense; theory behind and techniques to be used in designing evaluation methods and procedures for determining reliability of component parts and total systems.

ENM 527. (3) RANDOM PROCESSES IN SYSTEM THEORY II. A continuation of Enm 517 Random Processes in System Theory I, with emphasis on Markov Processes and Random Dynamical Systems. Prerequisite: Enm 517, or Elc 517.

ENM 528. (3) DESIGN AND ANALYSIS OF EXPERIMENTS. Covers advanced topics in statistical experiments with emphasis on the design aspects. Topics include confounding, fractional replication, factorial and nested designs.

ENM 540. (3) INPUT-OUTPUT ANALYSIS. A study of the basic ideas of Input-Output Analysis, with emphasis on its application to economic and technological planning in public and private sectors of the economy.

ENM 541. (3) PRODUCTION ENGINEERING. The design of systems of men and machines for the production process; forecasting, scheduling, production and inventory control, staffing, plant layout, and equipment replacement. Prerequisites: Enm 502, Enm 521 or equivalent.

ENM 551. (3) POLICY ANALYSIS AND PLANNING IN PUBLIC SYSTEMS. This course is intended to provide a general introduction and conceptual framework for discussing the diagnosis, design, and management of social economic systems. The approach is an integrative one which attempts to organize the disciplines and tools of general systems theory, systems engineering, future studies, and organization development to meet the demands of policy research and management for complex, large scale social economic systems.

ENM 555. (3) SYSTEM DYNAMICS I. The methodology for modeling the dynamics of complex social-economic systems is developed. The use of these models to study organizational policies and design for higher order, multiple-loop, nonlinear feedback structures is considered in detail. Prerequisite: Enm 502.

ENM 585. (3) ORGANIZATIONAL SYSTEMS. The application of systems theory to the operation of governmental, business, and educational organizations. Conventional theories are related to the systems approach to an understanding of organizations.

ENM 590. (3) SEMINAR IN ENGINEERING MANAGEMENT. An analysis in depth of strategically important areas of engineering management which are being influenced by technological innovations. Will include guest lectures on selected topics, team studies and the correlation of administrative practice with theory.

ENM 595. (2-6) SPECIAL PROBLEMS IN ENGINEERING MANAGEMENT. Particular assignments to be arranged and approved by the chairman of the student's advisory committee.

ENM 599. (3-9) MS THESIS IN ENGINEERING MANAGEMENT. Students engaged in Master's thesis research must register for this course and continue registering each semester until the thesis is completed for a total credit of not more than nine hours (usually six hours).

ENM 620. (2-6) EDUCATIONAL SYSTEMS ENGINEERING. Particular assignment and projects dealing with the study of policy analysis and development for the educational system.

ENM 625. (2-6) PUBLIC SYSTEMS ENGINEERING. Particular assignment and projects dealing with the study of policy analysis and development for public systems.

ENM 626. (3) SYSTEM DYNAMICS II. The continuation of System Dynamics I with special emphasis on the study of large scale corporate, urban, educational and ecological systems. Prerequisite: Enm 555.

ENM 630. (3) ADVANCED TOPICS IN LINEAR PROGRAMMING. Main emphasis on computational techniques and applications of linear programming to industrial problems, primal-dual algorithm, decomposition principle, assignment, transportation and trans-shipment problems, network flow algorithm and integer programming. Prerequisite: Enm 521.

ENM 631. (3) NON-LINEAR AND DYNAMIC PROGRAMMING. Development of the theory and computational techniques of non-linear and dynamic programming. Includes applications of optimization methods, non-linear programming problems, stochastic programming, gradient methods, dynamic programming. Kuhn-Tucker theory and quadratic programming. Prerequisite: Enm 630.

ENM 640. (3) ADVANCED TOPICS IN RELIABILITY AND MAINTAINABILITY. The exact content of this course will vary from year to year. The major emphasis will be to study the latest research in the field and evaluate the impact these developments will have on future practices in reliability and maintainability. Prerequisites: Enm 525 or equivalent.

Engineering Mechanics (EGM)

Seymour J. Ryckman, *Chairman*

EGM 501. (3) EXPERIMENTAL STRESS ANALYSIS. A study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gauges. Also covered are photoelasticity, brittle coatings, photoelastic coatings, analogies, structural similitude. Two hours lecture and one three-hour lab per week. Prerequisite: Egm 304.

EGM 519. (3) ANALYTIC DYNAMICS. Kinematics, relative motion, constraints and generalized coordinates, Hamilton's principle, Lagrange's equations, variational principles. Applications to particle dynamics and rigid body motion. Prerequisites: Egm 301, Mth 219, or equivalent.

EGM 530. (3) APPLIED ELASTICITY. Equations of equilibrium and continuity; solution of two-dimensional problems in rectangular and curvilinear coordinates by means of stress functions; St. Venant's principle; energy methods; stress concentrations; introduction to three-dimensional and thermal stress problems; application of finite difference equations. Prerequisite: Egm 304.

EGM 539. (3) THEORY OF PLASTICITY. Fundamentals of elasticity and plasticity, yield criteria, plastic stress-strain relations, theories of work hardening. Extremum principles. Application to problems of bending, torsion, plane stress and plane strain. Slip line and limit analysis. Prerequisite: Mee 533.

EGM 595. (2-6) SPECIAL PROBLEMS IN ENGINEERING MECHANICS. Particular assignments to be arranged and approved by the Chairman of the Department of Civil or Mechanical Engineering.

Materials Engineering (MAT)

Dr. Alden E. Ray, *Director*

MAT 501. (3) PRINCIPLES OF MATERIALS I. The electronic, atomic, submicroscopic, microscopic and macroscopic structures of crystalline solids are presented. Specific topics include bonding, electron theory of metals, crystals, dislocations, phase diagrams, phase transformations, and diffusion. Prerequisite: Mth 219.

MAT 502. (3) PRINCIPLES OF MATERIALS II. A general introduction to the mechanical and electronic properties of materials. Elasticity; plasticity creep; fracture; electrical and thermal processes; magnetic, dielectric and optical properties. Prerequisite: Mat 501.

MAT 503. (3) X-RAY CRYSTALLOGRAPHY. An introduction to the fundamentals of crystallography and x-ray diffraction techniques with application to the study of materials. Two hours lecture plus one three-hour laboratory per week. Prerequisite: Mat 501 or consent of instructor.

MAT 504. (3) TECHNIQUES IN MATERIALS ANALYSIS. Fundamentals and applications of the traditional analytical methods such as metallography, x-ray analysis, electron microprobe, transmission and scanning electron microscopy. Recent techniques: NMR, EPR, Atomic absorption, Raman and Mossbauer spectroscopy, Holography, ESCA and Anger spectroscopy. Emphasis is placed on applicability. Prerequisite: Mat 501 or consent of instructor.

MAT 505. (3) THERMODYNAMICS OF SOLIDS. Thermodynamic properties of solutions and intermediate phases. Equilibrium behavior of phase mixtures. Representation of multicomponent phase diagram. Experimental determination and prediction of phase diagrams. Prerequisite: Mat 502 or consent of instructor.

MAT 506. (3) MECHANICAL BEHAVIOR OF MATERIALS. Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep and rupture. Prerequisite: Mat 502 or consent of instructor.

MAT 507. (3) INTRODUCTION TO CERAMIC MATERIALS. Ceramic raw materials, manufacturing processes, and unique properties of ceramic products: glasses, porcelain enamels, ceramic-metal seals, electrical and magnetic ceramics, refractories, and ceramics for special applications. Prerequisite: Mat 501.

MAT 508. (3) PRINCIPLES OF MATERIALS SELECTION. Basic scientific and practical consideration involved in the intelligent selection of materials for specific applications. The impact of new developments in materials technology and analytical techniques are emphasized. Prerequisite: Mat 501 or consent of instructor.

MAT 509. (3) INTRODUCTION TO POLYMER SCIENCE. An introduction to polymers. A survey of the field is made largely in a non-mathematical way. Prerequisites: College Chemistry and Calculus.

MAT 510. (3) PHYSICAL PROPERTIES OF POLYMERS. An intensive discussion of the interrelations between molecular and gross physical properties of polymers. Prerequisites: Mat 509 or equivalent, background in differential equations.

MAT 511. (3) PRINCIPLES OF CORROSION. The application of electrochemical principles, corrosion reactions, passivation, cathodic and anodic protection, stress corrosion and high temperature oxidation.

MAT 512. (3) MAGNETIC MATERIALS: PHYSICAL PRINCIPLES. Description of magnetic material properties. The magnetic circuit. Atomic magnetism. Types of magnetic order and spin structures. Intrinsic magnetization. Molecular field concept. Anisotropy. Magnetostriction. Magnetic resonances. Prerequisite: Ele 333 or consent of instructor.

MAT 513. (3) MAGNETIC MATERIALS FOR ENGINEERING APPLICATIONS. Magnetic domains. Technical magnetization and domain structure. A.C. properties, losses, eddy currents. Causes of coercivity. Metallic and ceramic materials for transformers, electrical machinery, permanent magnets, HF devices, data recording, computer memories, etc. Metallurgy and crystallography of magnetic materials. Prerequisite: Mat 512 or consent of instructor. Note: Simultaneous attendance in Mat 513S is recommended.

MAT 513S. (1) MAGNETIC MATERIALS PROSEMINAR.

MAT 514. (2) APPLIED SUPERCONDUCTIVITY: AN INTRODUCTION. Basic phenomena. Theoretical concepts. Superconductive materials—types, properties, physics, metallurgy. Superconducting magnets. Other present and future engineering applications. Consent of instructor required.

MAT 515. (3) STATISTICAL THERMODYNAMICS. Microscopic thermodynamics; Kinetic theory; Virial theorem of Clausius; transport phenomena; Gibbs, Boltzman, Bose-Einstein, Fermi-Dirac Statistics. Connection between statistical and thermodynamic quantities. Applications to Perfect and Real gases, liquids, crystalline solids, and thermal radiation. Information theory, irreversible thermodynamics. Prerequisites: Mee 301, Mth 219.

MAT 550. (1-6) MATERIALS ENGINEERING PROJECT. Student participation in a materials engineering project under the direction of a project advisor. To obtain credit, the student must prepare a satisfactory written report, as determined by the project advisor, and present an open seminar on the subject of the project.

MAT 590. (1-3) SELECTED READINGS IN MATERIALS ENGINEERING. Directed readings in selected area of Materials Engineering arranged and approved by the student's advisor and the program director.

MAT 595. (1-3) SPECIAL PROBLEMS IN MATERIALS ENGINEERING. Special assignments arranged by the Materials Engineering faculty.

MAT 601. (3) SURFACE CHEMISTRY OF SOLIDS. The nature of solid surfaces and their importance to chemical and physical reactions at solid-gas, solid-liquid, at solid-solid interfaces. Prerequisites: Mat 501 and Mat 502 or consent of instructor.

MAT 602. (2) MAGNETIC EXCHANGE INTERACTION THEORIES. Molecular field theory of Ferro, ferri- and anti-ferromagnets. Direct, indirect and super-exchange interactions. Localized-ion vs. band-model theories. Complex magnetic spin structures. (This course emphasizes physical concepts rather than detailed mathematical developments.) Prerequisite: Mat 513 (Ele 524) or consent of instructor.

MAT 603. (2) MAGNETIC ANISOTROPY AND MAGNETOSTRICTION. Mathematical description of magnetic anisotropy and magneto-elastic phenomena. Physical causes of magneto-crystalline anisotropy and magnetostriction. Relationship to theory of magnetic exchange. Prerequisite: Mat 513 (Ele 524) or consent of instructor.

MAT 690. (1-3) SELECTED READINGS IN MATERIALS ENGINEERING. Directed readings in materials engineering area to be arranged and approved by the chairman of the student's advisory committee and the program director. This course may be repeated.

MAT 695. (1-3) SPECIAL PROBLEMS IN MATERIALS ENGINEERING. Special assignments in materials engineering subject matter to be arranged and approved by the student's doctoral advisory committee and the program director. This course may be repeated.

MAT 698. (1-15) D.E. DISSERTATION. An original investigation as applied to materials engineering practice. Results must be of sufficient importance to merit publication.

MAT 699. (1-15) PH.D. DISSERTATION. An original research effort which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Mechanical Engineering (MEE)

Dr. Howard E. Smith, *Chairman*

Students who have completed work equivalent in nature to the stated prerequisite courses may be enrolled in these courses with the consent of the instructor.

MEE 500. (3) ADVANCED ENGINEERING ANALYSIS. Utilization of fundamental principles from mechanics and thermodynamics along with auxilliary laws from the various engineering disciplines for the analysis of practical problems from industry. Emphasis is on the professional engineering approach which includes formulation of problem, assumptions, plan or method of attack, solving the problem, checking and generalizing the results.

MEE 501. (3) PRINCIPLES OF MATERIALS I. The electronic, atomic, submicroscopic, microscsopic and macroscopic structures of crystalline solids are presented. Specific topics include bonding, electron theory of metals, crystals, dislocations, phase diagrams, phase transformations, and diffusion. Prerequisite: Mth 219.

MEE 502. (3) PRINCIPLES OF MATERIALS II. A general introduction to the mechanical and electronic properties of materials. Elasticity; plasticity; creep; fracture; electrical and thermal processes; magnetic, dielectric and optical properties. Prerequisite: Mee 501.

MEE 505. (3) THERMODYNAMICS OF SOLIDS. Thermodynamic properties of solutions and intermediate phases. Equilibrium behavior of phase mixtures. Representation of multi-component phase diagrams. Experimental determination and prediction of phase diagrams. Prerequisite: Mee 302, Mee 502 or consent of instructor.

MEE 506. (3) MECHANICAL BEHAVIOR OF MATERIALS. Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep and rupture. Prerequisite: Mee 502 or consent of instructor.

MEE 508. (3) PRINCIPLES OF MATERIALS SELECTION. Basic scientific and practical consideration involved in the intelligent selection of materials for specific applications. The impact of new developments in materials technology and analytical techniques are emphasized. Prerequisite: Mee 501 or consent of instructor.

MEE 511. (3) CLASSICAL THERMODYNAMICS. Equilibrium, first law, second law, state principle, and zeroth law; development of entropy and temperature from availability concepts; chemical potential, chemical equilibrium, and phase equilibrium. Thermodynamics of irreversible processes; Onsager reciprocal relations; application of these concepts to diffusion, electronic phenomena in solids, direct energy conversion, and biological problems.

MEE 512. (3) CONDUCTION HEAT TRANSFER. Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics, numerical analysis, and analogic experiments.

MEE 513. (3) PROPULSION. Principles of propulsive devices, aerothermodynamics, diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet, turbo-fan, prop-fan engines, turbo-prop and turboshaft engines, RAM and SCRAM jet analysis and a brief introduction to related materials and airframe-propulsion interaction. Prerequisite: Mee 418.

MEE 514. (3) DIRECT ENERGY CONVERSION. Introduction to the principles of direct energy conversion. The following topics are discussed: irreversible thermodynamics; semiconductors; thermoelectric, thermomagnetic, photovoltaic, and thermionic devices; magnetohydrodynamics; fuel cells. Prerequisites: Mee 302, Mee 303.

MEE 515. (3) STATISTICAL THERMODYNAMICS. Microscopic thermodynamics; Kinetic theory; Virial theorem of Clausius; transport phenomena; Gibbs, Botzmann, Bose-Einstein, Fermi-Dirac Statistics. Connection between statistical and thermodynamic quantities. Applications to Perfect and Real gases, liquids, crystalline solids, and thermal radiation. Information theory, irreversible thermodynamics. Prerequisites: Mee 301, Mth 219.

MEE 516. (3) CONVECTION HEAT AND MASS TRANSFER. Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, superposition of solutions, eigenvalue problems. Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite: Mee 410.

MEE 517. (3) RADIATION HEAT TRANSFER. Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorbiditivity of gases. Introduction to radiative exchange in gases.

MEE 518. (3) SOLID STATE ENERGY CONVERSION. A study of thermoelectric devices and solar cells with applications to power generation and cooling. Emphasis on complete design including contact resistance, temperature dependent properties and heat transfer. Two hours lecture and one three-hour lab per week. Prerequisite Mee 410.

MEE 519. (3) ADVANCED TOPICS IN ENERGY CONVERSION I. Analysis of magnetoplasmadynamic and thermionic generators; Hall and Faraday modes, non-equilibrium ionization, high vacuum diode. Prerequisite: Mee 402.

MEE 521. (3) VISCOUS FLOW. Fundamentals of viscous flow. Navier-Stokes and boundary layer equations. Exact and approximate solutions of these equations using modern computational procedures for both laminar and turbulent flows. Prerequisite: Mth 403.

MEE 522. (3) POTENTIAL FLOW. Fundamental equations, kinematics and dynamics of fluid flow. Principles of irrotational flow. Conformal representation of two-dimensional flow. Prerequisite: Mee 308; Corequisite: Mth 404.

MEE 523. (3) COMPRESSIBLE FLOW. Fundamental equations of compressible flow, introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one dimensional motion and shock tube theory. Prerequisite: Mee 418.

MEE 531. (3) KINEMATIC SYNTHESIS OF MECHANISMS. Synthesis of mechanisms generating a predetermined motion. Introduction to spatial mechanisms.

MEE 532. (3) ENVIRONMENTAL ACOUSTICS AND VIBRACOUSTICS. Physics of sound propagation. Physiological and legal aspects of sound. Measurement and analysis of sound and vibrations. Vibration and sound control techniques, source modifications, path modifications, receiver modifications. Acoustic considerations in machine design.

MEE 533. (3) ELASTIC ANALYSIS. Three dimensional stress and strain tensors, equations of elasticity energy theorems, theory of beams; elastic stability of beams, energy and numerical methods in elastic stability. Prerequisites: Egm 303, Mth 219.

MEE 534. (3) PLATES AND SHELLS ANALYSIS. Cylindrical bending of plates, circular and rectangular plates under symmetric and unsymmetric loadings, stability of plates; membrane theory of shells, axisymmetric and cylindrical shells. Prerequisite: Egm 304 or Mee 533.

MEE 535. (3) MECHANICAL VIBRATIONS. Multi-degree of freedom systems, Lagrange's equations, transient vibrations, vibrations of continuous systems. Matrix and numerical methods. Introduction to finite element method. Introduction to nonlinear vibrations. Prerequisite: Mee 319.

MEE 536. (3) FEEDBACK CONTROL SYSTEMS. Study of automatic control with particular emphasis on process control (hydraulic, pneumatic and mechanical systems), stability analysis, introduction to the numerical control of machine tools. Prerequisite: Mee 435.

MEE 537. (3) MATRIX STRUCTURAL ANALYSIS. Matrix formulations of structures using direct and energy approaches; displacement, force and combined methods; the finite element technique. Applications to spring-mass systems, bars, beams, trusses, plate and shells. Computer solution of elected problems. Prerequisite: Mee 534.

MEE 538. (3) STABILITY OF NONCONSERVATIVE ELASTIC SYSTEMS. Static method of stability prediction for elastic systems subjected to conservative forces. Dynamic method when forces are nonconservative. Follower forces. Stability of flexible shafts, rotors, centrifuges. Aeroelasticity and wing flutter. Panel and membrane flutter in supersonic flow. Galerkin's method.

MEE 539. (3) THEORY OF PLASTICITY. Fundamentals of elasticity and plasticity, yield criteria, plastic stress-strain relations, theories of work hardening. Extremum principles. Application to problems of bending, torsion, plane stress and plane strain. Slip line and limit analysis. Prerequisite: Mee 533.

MEE 540. (3) BEARINGS AND BEARING LUBRICATION. The theoretical aspects of lubrication; determination of pressure distribution in bearings from viscous flow theory; application of hydrodynamic and hydrostatic bearing theories to the design of bearings; high-speed bearing design problems; properties of lubricants; methods of testing.

MEE 545. (3) COMPUTER AIDED DESIGN. Modeling of mechanical, electrical and distributed parameter systems and structures. Simulation of systems using analog and/or digital computer; analysis by analytical and numerical methods; development of design criteria and optimization techniques.

MEE 550. (1-6) MECHANICAL ENGINEERING PROJECT. Student participation in a departmental research, design, or development project under the direction of a project advisor. To obtain credit, the student must show satisfactory progress in the project as determined by the project advisor and must present a written report at the conclusion of the project.

MEE 565. (3) FUNDAMENTALS OF COMBUSTION. Heat of combustion and flame temperature calculations; rate of chemical reaction and Arrhenius relationship; theory of thermal explosions and the concept of ignition delay and critical mass; phenomena associated with hydrocarbon-air combustion; specific applications of combustion.

MEE 566. (3) COMBUSTION THEORY. Theory of detonation (Rankine-Hugoniot relationships), and flame propagation rates in pre-mixed gas systems; turbulent flames and the well-stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials; ignition and flame spreading across solid materials.

MEE 590B. (1-3) SELECTED READINGS IN THERMAL ENGINEERING.

MEE 590C. (1-3) SELECTED READINGS IN FLUID MECHANICS.

MEE 590D. (1-3) SELECTED READINGS IN SOLID MECHANICS.

MEE 590E. (1-3) SELECTED READINGS IN MECHANICAL DESIGN.

Directed readings in the designated area to be arranged and approved by the student's faculty advisor and the department chairman. This course may be repeated.

MEE 595. (1-6) SPECIAL PROBLEMS IN MECHANICAL ENGINEERING.

Special assignments in Mechanical Engineering subject matter to be arranged and approved by the student's faculty advisor and the department chairman.

MEE 690B. (1-3) SELECTED READINGS IN THERMAL ENGINEERING.

MEE 690C. (1-3) SELECTED READINGS IN FLUID MECHANICS.

MEE 690D. (1-3) SELECTED READINGS IN SOLID MECHANICS.

MEE 690E. (1-3) SELECTED READINGS IN MECHANICAL DESIGN.

Directed readings in the designated area to be arranged and approved by the student's doctoral advisory committee and the departmental chairman. This course may be repeated.

MEE 695. (1-6) SPECIAL PROBLEMS IN MECHANICAL ENGINEERING. Special assignments in Mechanical Engineering subject matter to be arranged and approved by the student's doctoral advisory committee and the department chairman. This course may be repeated.

MEE 698. (1-15) D. E. DISSERTATION. An original investigation as applied to mechanical engineering practice. Results must be of sufficient importance to merit publication.

MEE 699. (1-15) PH.D. DISSERTATION. An original research effort which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

English (ENG)

Dr. B. J. Bedard, *Chairman*
Dr. M. H. Means, *Assistant Chairman*

Prerequisite for enrolling in any of the following courses for graduate credit is at least twenty-four semester hours in literature. All 500 level courses normally meet for two hours but yield three hours credit. The starred courses can be repeated for graduate credit when the topic or content changes.

*ENG 505. (3) CREATIVE WRITING. Supervised practice in writing in various literary forms. Conducted both by group discussions and by individual conferences and critiques. Permission of Chairman required.

*ENG 507. (1-6) STUDIES IN WRITING. Special Topics in Composition.

*ENG 514. (3) STUDIES IN MEDIEVAL LITERATURE. A treatment of the principal forms and movements in the literature of the Middle Ages, usually read in translation.

ENG 516. (3) CHAUCER I. An intensive analysis of *The Canterbury Tales.*

ENG 517. (3) CHAUCER II. A study of *Troilus and Criseyde* and the minor poems of Chaucer. Eng 516 is *not* a prerequisite.

*ENG 522. (3) STUDIES IN SIXTEENTH CENTURY LITERATURE. A treatment of the nondramatic literature of the English Renaissance.

ENG. 526.(3) SHAKESPEARE I. A consideration of the development of Shakespeare's art from the beginning to *Twelfth Night.* The course includes the early comedies and tragedies, the histories, and the romantic comedies.

ENG 527. (3) SHAKESPEARE II. An analysis of Shakespeare's development from *Hamlet* to *The Tempest.* The course includes the major tragedies, problem plays, and dramatic romances. Eng 526 is *not* a prerequisite.

*ENG 532. (3) STUDIES IN SEVENTEENTH CENTURY LITERATURE. A consideration of the principal poets and prose writers of the Stuart, Commonwealth, or Restoration Periods.

*ENG 536. (3) STUDIES IN DRAMA TO 1642. A survey of English drama from the beginning to the closing of the theatres.

*ENG 538. (3) STUDIES IN MILTON. A treatment of the major and minor poems and related prose of Milton.

*ENG. 542. (3) STUDIES IN EIGHTEENTH CENTURY LITERATURE. A study of the writers of the Augustan, Post-Augustan, and Pre-Romantic Ages.

*ENG. 546. (3) STUDIES IN THE NOVEL. A consideration of the development and characteristic forms of the novel.

*ENG. 552. (3) STUDIES IN ROMANTICISM. The nature and progress of English Romanticism as revealed in the principal poets of the early part of the Nineteenth Century.

*ENG. 556. (3) STUDIES IN NINETEENTH CENTURY LITERATURE. A treatment of the significant poets and essayists of the Victorian Age.

*ENG 562. (3) STUDIES IN TWENTIETH CENTURY LITERATURE. A study of significant movements, forms, and writers in the literature of the Twentieth Century.

*ENG 566. (3) STUDIES IN DRAMA SINCE 1660. A selective study of significant developments in drama from the Restoration to the present.

*ENG 570. (3) STUDIES IN EARLY AMERICAN LITERATURE. A study of the cultural and literary roots of American literature.

ENG 572. (3) THE ROMANTIC AGE IN AMERICAN LITERATURE. A consideration of the writers of the mid-nineteenth century.

*ENG 576. (3) MAJOR AMERICAN WRITERS. An intensive comparative study of two or three American writers considered in depth.

*ENG 582. (3) STUDIES IN AMERICAN LITERATURE SINCE THE CIVIL WAR. A consideration of the principal movements in poetry, fiction, or drama of the late Nineteenth or Twentieth Century.

*ENG 587. (3) STUDIES IN THE HISTORY OF CRITICISM. A consideration of significant developments in the history of critical thought.

*ENG 588. (3) STUDIES IN CRITICISM. A treatment of significant topics in theoretical and/or practical criticism.

*ENG 590. (1) TEACHING OF COLLEGE ENGLISH. Discussion, instruction, and practice in the methods of teaching composition and literature. Required of and open only to Assistants.

*ENG 591. 1-6) STUDIES IN LITERATURE. An analysis of selected literary problems or areas.

ENG 593. (3) SURVEY OF LINGUISTICS. A study of the concepts and procedures of general linguistics, with emphasis on the relationships between linguistics and other disciplines.

ENG 595. (3) RESEARCH AND BIBLIOGRAPHY. An introduction to the methods and tools of literary scholarship. Required of all degree applicants.

ENG. 599. (3-6) THESIS.

*Required of all students.

History (HST)

Dr. Leroy Eid, *Chairman*

Courses numbered 5—also appear in the undergraduate cataloque. Enrollment is open to both graduate students and advanced undergraduate students. Courses numbered 6—are restricted to graduate students. The particular emphasis of starred (*) courses will be announced each term. They may be repeated for graduate credit when the topic and content changes.

HST 502. (3) MAIN CURRENTS IN ANCIENT HISTORY. Aspects of the civilizations of the Ancient Near East, Greece, and Rome selected because of their integration into Western Civilization. Emphasized topics: the Hebrew world view and value system, Greek democracy, Roman political and social institutions.

HST 504. (3) EARLY EUROPE. From the Diocletian reform of the Roman Empire to the mid-eleventh century, the course examines the decline of Rome and the construction of European Civilization. Emphasized topics: Byzantine and Islamic contributions, barbarian migrations, development of Christianity and the institutional Church, Carolingian Empire and the revival of learning, and the emergence of European monarchies.

HST 506. (3) THE RISE OF EUROPEAN STATES. Political and social aspects from the mid-eleventh to the mid-fourteenth century. Topics include: evolution of towns and commerce, crusading movement, rise of universities, medieval art and culture, and political construction and interaction of European monarchies.

HST 507. (3) RENAISSANCE AND REFORMATION. The development of European history from the 14th to the middle of the 17th century. Emphasis on the economic, political, social, and religious aspects of the Renaissance, Protestant Revolution, and Catholic Reformation.

HST. 508. (3) EARLY MODERN SPAIN AND PORTUGAL. A history of Spain and Portugal from the 15th century to the 18th century; Catholic Kings, Charles V, Phillip II, Henry the Navigator; and the Later Hapsburgs will be dealt with in detail; Spain and Portugal in Europe and the wider world.

HST 511. (3) ERA OF ABSOLUTISM, ENLIGHTENMENT. Designed to bridge the gap between the later Reformation and the era of the French Revolution. Intellectual and cultural developments will be covered, with emphasis on political, economic and social trends of the Old Regime.

HST 513. (3) THE REVOLUTIONARY ERA, 1789-1918. A historical analysis of the European nations and peoples emphasizing the themes of War and Revolution. The course covers the revolutions of the period as well as ideological, scientific, and technological developments.

HST 514. (3) TWENTIETH CENTURY EUROPE. Topics included: causes and outcome of World War I; internal policies of nations between the two World Wars; diplomatic actions leading to World War II; and the impact of World War II.

HST 515. (3) SOVIET UNION SINCE 1917. A detailed survey and analysis of the historical development of the U.S.S.R. from the Revolution of 1917 to the present time.

HST 518. (3) MILITARY HISTORY. This course touches upon the evolving concept and philosophy of war, the development and inter-relationships of weapons, tactics and strategy, and the role of military affairs in politics.

HST 524. (3) THE PARLIAMENTARY CONCEPT IN ENGLISH HISTORY. A study of the origins and development of common law and parliamentary government in England, stressing the medieval period.

HST 526. (3) TUDOR-STUART ENGLAND. A study of England—1485 to 1714. For the Tudor period, chief emphasis will be given to the development of the national state, royal absolutism, and the Reformation. The evolution of the constitutional question will be the main theme in the treatment of the Stuart era and Cromwellian Interregnum. The social, economic and cultural aspects of the period, as well as its diplomacy, will be fully covered.

HST 532. (3) NORTH AFRICA IN MODERN TIMES. A study of Morocco, Algeria, Tunisia, and Libya since the 16th century. Stress is placed on the institutional histories of these countries which enabled them ultimately to expel European imperialism.

HST 536. (3) SOUTH AFRICA IN MODERN TIMES. The establishment of the Bantu people and institutions and their subjection to assaults by Boers and British. Such study seeks to illuminate the present dominant governmental policy of apartheid.

HST 537. WEST AFRICA IN MODERN TIMES. West Africa's significance since the 18th century, with special references to the slave trade, the commercial revolution, religious ferment, imperialistic rivalry, and the recent independence movement.

HST 538. (3) THE MIDDLE EAST, 19TH AND 20TH CENTURIES. A survey of the Ottoman Empire, Iran, Egypt, and the modern states of the Middle East, emphasizing the development of nationalism and the place of the Middle East in international politics.

HST 543. (3) MODERN CHINA. A survey of the political, cultural and international developments in China from the eighteenth century to the present.

HST 547. (3) DIPLOMATIC HISTORY OF THE FAR EAST SINCE 1840. A survey of the diplomatic relations of China, Korea, and Japan among themselves and with other powers. The course selects major diplomatic events from 1840 to the present.

HST 548. (3) JAPAN SINCE PERRY. A historical study of the economic, social, and political developments of modern Japan from the end of the "Seclusion" to the present time.

HST 551. (3) AMERICAN COLONIAL HISTORY. A study of the foundations of American Nationality: European background of America, development of the colonial system, transplanting of ideas and institutions from the Old World, growth of democratic tendencies.

HST 552. (3) REVOLUTION AND CONFEDERATION. The course will treat the following topics: the problems of empire-relationships since 1754; the causes, conduct, and consequences of the American Revolution; the postwar problems leading to the adoption of the Federal Constitution.

HST 554. (3) THE AGE OF JEFFERSON AND JACKSON. Emphasizes the whole range of historical, cultural, social and political trends that are traditionally associated with the presidencies of Jefferson and Jackson. The period covered extends from the 1790's to the 1850's.

HST 555. (3) THE OLD SOUTH. A study of political, social, economic, and cultural history, emphasizing presiding themes of pre-Civil War Southern life—ruralism, cotton culture, extractive economics, slavery, developing political minority status in the nation. A general knowledge of American History is a prerequisite.

HST 556. (3) CIVIL WAR AND RECONSTRUCTION. Remote and immediate causes of the Civil War, especially from 1850 to 1861; problems of North and South during the war; consequences of the war; efforts to create a new Union, 1865-1877; problems created by those efforts.

HST 572. (3) APPLACHIA AND THE NEW SOUTH. A study and appraisal of the internal and external forces that have shaped the Southern states since the Civil War. All aspects of Southern life will be considered.

HST 574. (3) THE GILDED AGE, 1877-1900. A study in the political, diplomatic, economic, social, and cultural developments of the age. The rise of big business, organized labor, and the Populist revolt will be studied.

HST 575. (3) THE PROGRESSIVE PERIOD, 1900-1920. A study in depth of the major historical trends that dominated these years which saw the universal acceptance of America's claim to world power. Due attention will be placed on cultural as well as political developments.

HST 576. (3) BETWEEN THE WARS. Intensive study of chief facets of United States history from 1919 to 1941. Topics emphasized include: Normalcy, the Depression, the evolving New Deal, and the approach to World War II.

HST 577. (3) CONTEMPORARY AMERICAN HISTORY. Diplomatic and domestic history of the United States since the beginning of World War II. Topics include: Wartime Conference Diplomacy, the War, Russia and the Cold War, Cultural Trends of Mid-Century, Social Equality and the Politics of Protest.

HST 578. (3) INTERPRETATIONS IN AMERICAN HISTORY. Specific topics will be chosen for investigation and interpretation as determined by the instructor. The objective of the course is to study new interpretations of historical events. A general knowledge of American History is a prerequisite.

HST 582. (3) THE HISTORY OF MEXICO. Study of Mexican history since 1820. Origins of revolution of 1910 and its development to the present emphasize Mexico's struggle for democracy. Diplomatic and cultural relations between Mexico and the U.S. are considered.

HST 584. (3) CARIBBEAN SINCE 1801. Study of the cultural, social, economic and political history of the islands and the northern shore of South America in modern times, stressing areas that have gained independency or autonomy.

HST 600. (3) HISTORIOGRAPHY. The course will concentrate on a study of the principal historians and the chief contributions to the development of historical writing. Some familiarity with historical method will be required in the composition of research papers.

HST 601. (3) GRADUATE RESEARCH SEMINAR. A research seminar directed at the investigation and synthesis of primary research materials in the student's chosen field of concentration. The seminar will be unified around methodological approaches to the problems of research and writing.

*HST 610. (3) STUDIES IN EARLY EUROPEAN HISTORY. Selected developments in government, law, urban life, and learning from Rome's decline to the 15th century. Byzantine and Islamic contributions are included.

*HST 620. (3) STUDIES IN MODERN EUROPEAN HISTORY.

*HST 630. (3) STUDIES IN AFRICAN AND MID-EAST HISTORY.

*HST 640. (3) STUDIES IN ASIAN HISTORY.

HST 650. (3) THE PHILOSOPHY OF HISTORY. After surveying the various metaphysical interpretations of the meaning of history, the course then analyzes the literature concerned with the epistemological problems of writing history.

*HST 660. (3) STUDIES IN U.S. HISTORY BEFORE 1877.

*HST 670. (3) STUDIES IN U.S. HISTORY AFTER 1877.

*HST 680. (3) STUDIES IN LATIN AMERICAN HISTORY.

*HST 696. (1-3) SPECIAL STUDIES. Tutorial readings or research in special fields. By permission of the Chairman only.

HST 698. (1) TEACHING OF COLLEGE HISTORY. Discussion, instruction, and practice in the methods of teaching history and leading discussions. Required of and open only to Graduate Assistants. This does not count toward graduation.

HST 699. (3-6) THESIS.

*Required of all students.

Mathematics (MTH)

Dr. Kenneth C. Schraut, *Chairman*

MTH 510. (4) FUNDAMENTAL CONCEPTS OF VECTOR CALCULUS. The study of multidimensional calculus employing vector methods. Differentials of functions, transformations of integrals. The theorems of Green, Gauss and Stokes.

MTH 511. (4) FUNDAMENTAL CONCEPTS OF NUMBER THEORY. An examination of the elementary notions of divisibility, congruences, quadratic residues and Diophantine equations. Selected topics from the theory of prime numbers.

MTH 512. (4) FUNDAMENTAL CONCEPTS OF SET THEORY AND THE REAL NUMBER SYSTEM. An introduction to the theory of cardinal and ordinal numbers. Maximum principles and the axiom of choice. A systematic construction of the real number system.

MTH 513. (4) FUNDAMENTAL CONCEPTS OF ABSTRACT ALGEBRA. An introduction to the basic concepts of abstract algebra such as number postulates, groups, rings, fields, mappings, classes, and sets, as well as certain concepts taken from the classical theory of polynomial rings. A study of the relation of this material to the topics of high school algebra.

MTH 514. (4) FUNDAMENTAL CONCEPTS OF ANALYSIS. This course will include the concepts of number, sequence, function of a single real variable, limit, continuity, integration, differentiation, infinite series and the relationship of these concepts to the material in the high school curriculum.

MTH 515. (4) FUNDAMENTAL CONCEPTS OF LINEAR ALGEBRA AND VECTOR GEOMETRY. This course will include a study of the basic concepts of linear algebra such as linear independence, bases, linear transformations and matrices, determinants and systems of equations, as well as an introduction to vector geometry using the methods of linear algebra.

MTH 516. (4) FUNDAMENTAL CONCEPTS IN THE FOUNDATIONS OF GEOMETRY. An examination of the various types of geometry, from an axiomatic point of view, including incidence geometries, affine geometries, projective geometries, as well as a more detailed study of the Classical Euclidean, hyperbolic and elliptic geometries.

MTH 517. (4) FUNDAMENTAL CONCEPTS OF PROBABILITY AND STATISTICS. Probability functions, conditional probability, Bayes Theorem, independent events, probability distributions including the binomial, Poisson, uniform, normal, and gamma distributions, moments and moment generating functions, Chebyshev's inequality, the law of large numbers, distribution of functions of random variables, the central limit theorem.

MTH 518. (4) FUNDAMENTAL CONCEPTS OF STATISTICS WITH COMPUTER APPLICATIONS. Introduction to the Spectra 70/46 time sharing equipment using BASIC language. Descriptive statistics, Analysis of variance, computer simulation techniques, regression and correlation procedures.

NOTE: The above courses are normally offered only in the summer term in connection with the National Science Foundation sponsored Teacher's Institute. These courses may not be applied toward the regular Master's degree program in Mathematics.

MTH 519-520. (3 each term) STATISTICAL INFERENCE. Sample spaces, Boral fields, random variables, distribution theory, characteristic functions, exponential families, minimax and Bayes procedures, sufficiency, efficiency, Rao-Blackwell theorem, Neyman-Pearson Lemma, uniformly most powerful tests, multi-variate normal distributions.

MTH 521. (3) REAL VARIABLES I. The topology of the real line, continuity and differentiability, Riemann and Stieltjes integrals, Lebesgue measure, relationship between Riemann integrability-Jordan content and measure, Lebesgue integral.

MTH 522. (3) REAL VARIABLES II. Absolute continuity, differentiation and integration, the classical Banach spaces, Fourier series, extensions of the Lebesgue integral. Prerequisite: Mth 521.

MTH 523. (3) MEASURE THEORY AND INTEGRATION I. General theory of measure and integration over abstract spaces, abstract L_p spaces; product measures, Fubini's theorem, finite signed measures, Jordan-Hahn decomposition, Radon-Nikodym theorem, Riesz Representation theorem. Prerequisite: Mth 521.

MTH 524. (3) MEASURE THEORY AND INTEGRATION II. Integration over locally compact spaces, Baire measures, Borel measures, regular measures, content, Riesz-Markov theorem, advanced topics. Prerequisite: Mth 522, 523 and 571.

MTH 525. (3) COMPLEX VARIABLES I. Fundamental concepts, analytic functions, integration, singularities and series.

MTH 526. (3) COMPLEX VARIABLES II. Entire, meromorphic, periodic and multiple-valued functions; analytic continuation, conformal mapping, and other topics. Prerequisite: Mth 525 or equivalent.

MTH 531. (3) ADVANCED DIFFERENTIAL EQUATIONS I. Existence and uniqueness theorems, linear equations and systems, self-adjoint systems and boundary value problems, numerical methods. Prerequisite: Mth 403 or equivalent.

MTH 532. (3) ADVANCED DIFFERENTIAL EQUATIONS II. Asymptotic behavior and stability, Liapounov's theorems, perturbation theory. Prerequisite: Mth 531.

MTH 535. (3) PARTIAL DIFFERENTIAL EQUATIONS I. Classification of partial differential equations; methods of solution for the wave equation, Laplace's equation, and the heat equation; numerical solutions, applications. Prerequisite: Mth 403 or equivalent.

MTH 536. (3) PARTIAL DIFFERENTIAL EQUATIONS II. Existence and uniqueness theorems, canonical form, Green's theorems and operational methods, boundary value problems. Prerequisite: Mth 535.

MTH 545. (3) SPECIAL FUNCTIONS. The special functions frequently encountered in engineering and the physical sciences are studied. The hypergeometric function and generating functions are used throughout to develop the theory. The theories of infinite products and asymptotic expansions are also discussed. Prerequisites: Mth 404 or 461.

MTH 551. (3) METHODS OF MATHEMATICAL PHYSICS I. Linear transformations and matrix theory, linear integral equations, calculus of variations, eigenvalue problems. Prerequisite: Mth 403 or equivalent.

MTH 552. (3) METHODS OF MATHEMATICAL PHYSICS II. Linear and non-linear oscillators, partial differential equations and potential theory, functional transformations, special functions. Prerequisite: Mth 551.

MTH 555-556. (3 each term) ADVANCED NUMERICAL ANALYSIS. Quadrature methods and the numerical solution of ordinary differential equations; matrices and large scale linear systems; norms and spectral radii of matrices; modern iterative matrix methods, including the successive overrelaxation method; numerical solution of partial differential equations. Considerations will be given to methods suitable for use on digital computers. Prerequisite: Consent of instructor.

MTH 561. (3) MODERN ALGEBRA I. Groups, rings, integral domains and fields: extensions of rings and fields; polynomial rings and factorization theory in integral domains; groups with operators; modules and ideals.

MTH 562. (3) MODERN ALGEBRA II. Finite and infinite field extensions, algebraic closure, constructible numbers and solvability by use of radicals, Galois theory, advanced topics in groups and rings. Prerequisite: Mth 561.

MTH 565. (3) LINEAR ALGEBRA. Vector spaces, linear transformations and matrices; determinants, invariant direct-sum decomposition, rational and Jordan canonical forms; inner product spaces, the spectral theorem, bilinear and quadratic forms.

MTH 571. (3) TOPOLOGY I. An axiomatic treatment of the concept of a topological space; various operators on a set that define a topology; bases and subbases; connectedness, compactness; continuity, homeomorphisms, separation axioms and countability axioms; convergence in topological spaces.

MTH 572. (3) TOPOLOGY II. Compactification theory, paracompactness and metrizability theorems, uniform spaces, function spaces, and other advanced topics of current interest. Prerequisite: Mth 571 or equivalent.

MTH 573. (3) TOPOLOGICAL VECTOR SPACES I. The study of various topologies within linear spaces with emphasis on Banach and Hilbert spaces. The Hahn-Banach theorem and its consequences. Closed graph and open mapping theorems. Prerequisites: Mth 522, 565, and 571, or equivalents.

MTH 574. (3) TOPOLOGICAL VECTOR SPACES II. Banach algebras and spectral theory are studied in detail. Prerequisite: Mth 573.

MTH 575. (3) DIFFERENTIAL GEOMETRY. Vector and tensor algebra; covariant differentiation. An introduction to the classical theory of curves and surfaces treated by means of vector and tensor analysis.

MTH 590. (3 each term) TOPICS IN MATHEMATICS. This course will be given upon appropriate occasions and will deal with specialized material not covered in the regular courses. It may be taken more than once in different areas. Prerequisite: Consent of advisor.

MTH 598. (3-6) THESIS.

Philosophy (PHL)

Dr. Raymond M. Herbenick, *Chairman*

PHL 510. (3) PHILOSOPHY OF SCIENCE. A study of contemporary philosophical accounts of scientific explanation, prediction, confirmation, and discovery in the natural, life, and social sciences.

PHL 520. (3) PHILOSOPHY OF AUGUSTINE. An examination of the moral, social, political, legal, religious, epistemologies, and metaphysical issues raised by St. Augustine in his own writings and in those of his commentators and their bearing on problems in recent philosophy.

PHL 525. (3) PHILOSOPHY OF AQUINAS. A study of the moral, social, political, legal, religious, epistemological and metaphysical issues raised by St. Thomas in his own writings, as they are developed in those of his commentators, and as they bear on problems in recent philosophy.

PHL 540. (3) MEDIEVAL STUDIES. A study of the writings of a particular medieval philosopher and/or a particular problem in medieval philosophy. The course may be repeated for credit when the philosopher and/or problem varies.

PHL 541. (3) PHILOSOPHY OF PLATO. A detailed analysis of selected texts of Plato. The course may be repeated for credit when the topics and texts vary.

PHL 542. (3) PHILOSOPHY OF ARISTOTLE. A detailed examination of selected works of Aristotle. The course may be repeated for credit when the texts and topics vary.

PHL 543. (3) THE PRESOCRATIC PHILOSOPHERS. An in-depth study of the origins of philosophical thought from Hesoid and Thales to Socrates. The course contrasts the mythological and scientific traditions for philosophical development.

PHL 545. (3) MODERN FRENCH PHILOSOPHY. An examination of the leading philosophical movements in France with particular emphasis on Descartes, Pascal, and Malebranche.

PHL 550. (3) PHILOSOPHY OF HISTORY. A survey of the various metaphysical interpretations of the meaning of history and an examination of the epistemological problems of writing history.

PHL 553. (3) PHILOSOPHY OF KANT. An examination of the *Critique of Pure Reason* with emphasis on its metaphysical implications or a study of Kantian ethics in *Foundations of the Metaphysics of Morals* and the *Critique of Practical Reason,* with emphasis on the questions of law, freedom, happiness and God. The course may be repeated for credit when the topic and texts vary.

PHL 555. (3) MODERN GERMAN PHILOSOPHY. A study of the post-Kantian influences in modern Germanic philosophy through the idealistic developments of Fichte, Schelling, and Hegel, with an emphasis on their rationalistic theological thought, their return to metaphysics and their varying intellectual intuitionisms.

PHL 556. (3) PHILOSOPHY OF HEGEL. A study of the *Phenomenology of Spirit* in which Hegel rejects a formalistic explanation of the categories of understanding in favor of the dialectic of reason culminating in Absolute Reason. Additional reference may be made to his *Science of Logic, Lectures on the Philosophy of Religion,* and *Lectures on the History of Philosophy.*

PHL 560. (3) MODERN BRITISH PHILOSOPHY. A study of the 17th and 18th century empiricists such as Bacon, Hobbes, Locke, Berkeley, or Hume. Their psychological-epistemological approach to experience, facts, ideas, knowledge, substance, and causality will be examined as well as their relation to positivism.

PHL 563. (3) PHILOSOPHY OF C. S. PEIRCE. An investigation of the realist foundations of Peirce's theory of knowledge with special emphasis on his theory of signs and laws. Also includes a study of Peirce's pragmatic maxims and their application to descriptions and explanations in ordinary and scientific contexts.

PHL 565. (3) AMERICAN PRAGMATISM. An investigation of the major writings of William James or John Dewey in the pragmatic tradition. This course may be repeated for credit when the topic varies.

PHL 570. (3) EXISTENTIALISM. A study of existentialism as an original view on man and his world. The course is devoted to the study of one major existential philosopher each time and may be repeated for credit when the topic varies.

PHL 571. (3) PERCEPTION AND KNOWLEDGE. A survey of some fundamental and relevant neuro-physiological, psychological, and phenomenological studies on perception with emphasis on the various epistemological issues.

PHL 575. (3) CONTEMPORARY PHILOSOPHIES OF EVOLUTION. A study of the influence of evolutionary thought in Bergson, James, Dewey, Whitehead, Marxism, or contemporary Christian thought as in Teilhard de Chardin.

PHL 576. (3) CONTEMPORARY PROBLEMS IN THE PHILOSOPHY OF GOD. An examination of the works of contemporary religious philosophies.

PHL 577. (3) RECENT CHRISTIAN PHILOSOPHY. A study of the most recent attempts of some Catholic thinkers and theologians to develop approaches and solutions to the perennial problems of a Judaeo-Christian philosophy.

PHL 580. (3) PHILOSOPHY OF BERTRAND RUSSELL. An introduction to the main philosophical positions of Russell especially his epistemological empiricism, logical atomism, philosophic analysis of language, philosophy of religion, morality and political philosophy.

PHL 585. (3) PHENOMENOLOGY. A critical analysis of the phenomenological method as defined by and applied by Husserl, Merleau-Ponty, Sartre, Ricoeur or other major phenomenologist. May be repeated for credit when the content varies.

PHL 590. (3) DIRECTED STUDIES. This course is offered to augment the graduate student's previous training or to allow advanced study on a particular problem, philosopher, or historical era in his or her program. Arrange through the chairman.

PHL 591. (3) SEMINAR. Topics, authors, and/or problems in philosophy are selected by the professor.

PHL 592. (3) PHILOSOPHY OF ORDINARY LANGUAGE. A study of the objectives and methods of recent language-oriented philosophers such as Strawson, Ryle, J. L. Austin, Quine, Chomsky, Wittgenstein, etc.

PHL 594. (3) SYMBOLIC LOGIC. A study of the techniques and rationals of propositional and predicate, inductive and ordinary, modal and many-valued logics as practical tools for philosophers, as well as selected topics in the philosophy of logic.

PHL 598. (1) TEACHING INTERNSHIP IN PHILOSOPHY. Participation in seminars on the teaching of philosophy and in the directed teaching of a lower-level undergraduate philosophy course. Required of, and open only to, graduate philosophy assistants.

PHL 599. (3-6) THESIS.

Physics (PHY)

Dr. Joseph Kepes, *Chairman*

Any 300-400 level course in Physics may be taken for graduate credit under the usual conditions. All such courses must have the approval of the department.

PHY 505. (3) MODERN PHYSICS FOR ENGINEERS. Selected topics in atomic physics, the solid state, and nuclear physics; elementary quantum mechanics and application to the free-particle and the one-electron atom; X-rays, elementary particles, cosmic rays will also be studied to some extent.

PHY 511. (3) CLASSICAL MECHANICS. Analytical dynamics; variational techniques; Hamilton's Principle; the Lagrangian, the Hamiltonian, Hamilton-Jacobi and Poisson Bracket formulations of mechanics; Galilean and Lorentz invariance; and relativistic dynamics. Prerequisite: Phy 303-304 or equivalent.

PHY 512. (3) CLASSICAL THEORY OF FIELDS. Hamilton's Principle extended to fields; Lagrangian formulation used to obtain conservation laws, symmetry and invariance principles; the Klein-Gordon, Maxwell, and Dirac equations cited as examples of scalar, vector, and spinor fields; interacting fields and radiative solutions. Prerequisite: Phy 511 or consent of instructor.

PHY 515. (3) STATISTICAL MECHANICS. Basic assumptions; statistics of independent particles; the Maxwell Boltzman Distribution; Fermi-Dirac, Bose-Einstein Statistics; applications of distribution laws.

PHY 518. (3) THEORETICAL PHYSICS I. Topics can include calculation techniques in Modern Physics, complex variable theory, dispersion relations, linear vector spaces, operators, matrix mechanics, eigenvalue equations. Prerequisites: Mth 403-4, or consent of instructor.

PHY 519. (3) THEORETICAL PHYSICS II. Topics can include Orthogonal functions, Dirac delta function, Laplace's equation, Poisson's equation, D'Alembert's equation, transformation theorems, Green's function, Group theory. Prerequisites: Mth 403-4, or consent of instructor.

PHY 520. (3) ADVANCED SOLID STATE PHYSICS. Crystal structure, thermal properties of solids; insulators; band theory of solids; semi-conductors; luminescence. Prerequisite: Phy 525 or consent of instructor.

PHY 521. (3) ADVANCED NUCLEAR PHYSICS. Basic properties of the nucleus; the deuteron; nuclear binding energies; scattering; nuclear forces; high energy particles. Prerequisite: Phy 525 or consent of instructor.

PHY 523. (3) ADVANCED ELECTRICITY AND MAGNETISM I. The boundary value problems of electrostatics and magnetostatics in material media; conservation laws; existence and nature of electromagnetic radiation derived from Maxwell's equations; wave guides and Resonant Cavities.

PHY 524. (3) ADVANCED ELECTRICITY AND MAGNETISM II. Radiating Systems, interference, and diffraction; special applications of electromagnetic theory made to plasmas, charged particle collisions, Cherenkov radiation, Bremsstrahlung, and multipole fields. Prerequisite: Phy 523.

PHY 525. (3) QUANTUM MECHANICS I. The physical basis of quantum mechanics, wave packets, free particle motion; Schrodinger's equation applied to potential problems; Harmonic Oscillator and the hydrogen atom; three dimensional extrapolation and scattering. Prerequisite: Phy 511.

PHY 526. (3) QUANTUM MECHANICS II. Linear vector spaces and spin; time dependent and time independent perturbation theory; the formal theory of scattering is developed and the importance of symmetries and rotations is discussed. Prerequisite: Phy 525.

PHY 531. (3) ADVANCED GRADUATE LABORATORY. Advanced experiments in classical mechanics, electricity, magnetism, atomic, nuclear and solid state physics. Prerequisite: Approval of Graduate advisor.

PHY 540. (3) INTRODUCTION TO POLYMER SCIENCE. An introduction to polymers. A survey of the field is made largely in a non-mathematical way. Prerequisites: College chemistry and calculus.

PHY 541. (3) PHYSICAL PROPERTIES OF POLYMERS. An intensive discussion of the interrelations between molecular and gross physical properties of polymers. Prerequisites: Physics 540 or equivalent, background in differential equations.

PHY 590. (0-6) GRADUATE THESIS. A research problem in selected topics of physics resulting in a written thesis.

PHY 595. (0) GRADUATE SEMINAR. Weekly Seminars presented by graduate students, faculty and guest lecturers on current topics.

PHY 599. (1-3) SPECIAL PROBLEMS IN (NAMED AREA). Laboratory or library work in one of the following selected topics: Solid State Physics, Polymer Physics, X-Rays, Nuclear Physics, Modern Optics, General Physics, Advanced Quantum Mechanics. May be taken more than once.

Political Science (POL)

Dr. Antonio E. Lapitan, *Chairman*
Mr. Lyndon Abbott, *Director MPA Program*

Graduate students in Political Science and Public Administration may take certain 400 level courses for graduate credit, with the permission of the Chairman of the Department.

POL 501. (3) SCOPE AND METHODS OF POLITICAL SCIENCE. An analysis of theoretical approaches to the study of politics and the techniques and methodologies currently employed in political science research.

POL 508. (3) AMERICAN FOREIGN POLICY. A study of the foreign policy-making process in the United States with special attention to the process of policy development and the substance of American foreign policies in regard to selected areas and problems.

POL 510. (3) PUBLIC ADMINISTRATION. A study of the administrative organization, systems, processes, and methods as applied to governmental programs and operations, with a comparison of structural and behavioral approaches.

POL 514. (3) HISTORY OF WESTERN THEORY. A study of the Western political heritage as fashioned by the great Western political thinkers from Plato through Marx and Lenin.

POL 520. (3) SEMINAR: POLITICS OF DEVELOPING NATIONS. A systematic analysis of the political processes and the nature of political development in selected developing countries.

POL 521. (3) INTERGOVERNMENTAL RELATIONS. A study of the interaction process of different levels of government in the United States including problems of federalism, interstate cooperation and federal-urban relations.

POL 523-528. (3) SEMINAR: COMPARATIVE POLITICS. A systematic analysis of the political structures and processes of selected country or countries in each of the following areas with emphasis on their capabilities to maintain political stability.

Pol 523. Soviet Union and Eastern Europe	Pol 526. Latin America
Pol 524. Western Europe	Pol 527. Far East
Pol 525. Africa	Pol 528. Southeast Asia

POL 530. (3) SEMINAR: INTERNATIONAL LAW. A study of the principles and practices in public international law with emphasis on the processes of growth and change in international law.

POL 535. (3) FISCAL ADMINISTRATION. A study of governmental expenditures and revenues, budgetary and financial reporting, fiscal policy, and other areas of fiscal management, with emphasis upon current practices and problems.

POL 540. (3) PROBLEMS IN PUBLIC ADMINISTRATION. A seminar on selected problems in public administration. May be repeated once when the topic changes.

POL 545. (3) SEMINAR: URBAN POLITICS. A study of the political processes and governmental structures in urban areas with emphasis on the relations among governmental units, community power structure and the formulation and execution of public policy.

POL 552. (3) GOVERNMENT PLANNING. This course considers the planning function in the administrative process, and the role of planning agencies in decision making and problem solving. Trends and changing characteristics of planning in the United States are evaluated.

POL 557. (3) SEMINAR: STATE GOVERNMENT AND POLITICS. A comparative study of the political institutions and processes of state governments in the United States with emphasis on constitutional reform.

POL 560. (3) AMERICAN POLITICAL THOUGHT. A study of basic political ideas that have influenced the development of American thought.

POL 567. (1-3) STUDIES IN POLITICAL SCIENCE. Directed reading and research on specific topics in American politics and institutions; public law, theory and methodology; comparative politics; and international relations. May be repeated once when the topic changes.

POL 569. (3) SEMINAR IN POLITICAL THEORY. A research seminar with emphasis upon the various facets of classical or contemporary political theory. May be repeated once when the content changes.

POL 571. (3) CONSTITUTIONAL LAW. A study of the judicial process in the development of the American Constitution. Competing constitutional philosophies are explored in the context of landmark cases. Emphasis is placed upon contemporary developments.

POL 572. (3) ADMINISTRATIVE LAW. A study of the judicial functions and activities of federal agencies; formal and informal processes in administrative hearings; basic principles of administrative law; judicial interpretation; the question of increased judicialization of the administrative process.

POL 573. (3) CIVIL LIBERTIES. A seminar concentrating on the endless philosophical conflict between the demand for individual liberty on the one hand and the need for authority on the other. Major focus will be on the United States.

POL 574. (3) SEMINAR: AMERICAN POLITICS. This course will involve, in each term in which it is offered, an analysis of presidential leadership and politics, statutory regulation of political parties, or demography and political behavior. May be repeated once when the topic changes.

POL 576. (3) PUBLIC PERSONNEL ADMINISTRATION. A survey of the development of personnel administration in the Federal government and some selected state and municipal governments focusing on such questions as selection, training, and labor relations.

POL 578. (1-3) STUDIES IN PUBLIC ADMINISTRATION. Directed readings and research on specific topics in public administration. May be repeated once when the topic changes.

POL 579 (3) SELECTED TOPICS IN PUBLIC POLICY. An intensive examination of the policy process, policy outcomes, and policy impact in an area or arease of public policy selected by the instructor. The particular policy area will vary from semester to semester among such topics as transportation, education, welfare, national defense, science, civil rights, and urban and community development. May be repeated once when the topic changes.

POL 580 (3) ORGANIZATIONAL SYSTEMS. The application of systems theory to the operation of governmental, business, and educational organizations. Conventional theories are related to the systems approach to an understanding of organizations.

POL 581. (3) ORGANIZATIONAL THEORY. This course surveys current literature and research on the theory of complex organizations. It deals with rationality in decision-making; problems of authority; behavioral, political, and technical influences on organizations.

POL 582. (3) COMPARATIVE PUBLIC ADMINISTRATION. Major characteristics of the administrative systems of selected countries are compared in the light of prevailing political, economic, and cultural influences. Problems of theory and methodology in the comparative study of public administration are explored.

POL 584. (3) COMPARATIVE FOREIGN POLICY. Comparative analysis of the foreign policies of major states with emphasis on the process of policy development and on the national and international determinants of policy behavior.

POL. 589. (3) SEMINAR: INTERNATIONAL RELATIONS. A research seminar with emphasis placed upon the current theories and problems of international relations and organizations. May be repeated once when the content changes.

POL 595. (3-6) GOVERNMENT INTERNSHIP. Assignment to appropriate government agencies or units for the purpose of gaining wide-experience with the administrative system through a rotating program of work experience.

POL 599. (3-6) THESIS. A research monograph which allows the student to demonstrate his knowledge of appropriate literature, his ability to collect and analyze data, and his application of certain research methodology.

Psychology (PSY)

Dr. Richard J. Popp, *Chairman*

PSY 501. (3) ADVANCED STATISTICS I. A survey of the principles of sampling, estimation, and hypothesis-testing as applied to bivariate regression, simple analysis of variance and sturdy statistics. Prerequisite: Undergraduate Statistics.

PSY 502. (3) ADVANCED STATISTICS II. Application of the general linear model in complex factorial designs and selected multivariate techniques, including multiple regression, principle components and canonical correlation. Prerequisite: Psy 501.

PSY 508. (3) ADVANCED EXPERIMENTAL PSYCHOLOGY. Theory of scaling; concepts on the transformation of data as applied to problems of sensory and cognitive functions. Prerequisite: Psy 501, permission of advisor. Two hours lecture and one two-hour lab per week.

PSY 511. (3) EXPERIMENTAL CHILD PSYCHOLOGY. An evaluation of some current theoretical issues in Developmental Psychology and the experimental methods which have been useful in attempts toward their solution, along with a survey of exciting data from such research involving children. Prerequisite: Psy 306 or equivalent. (Psy 403 is recommended)

PSY 512. (3) PERCEPTUAL AND ATTENTIONAL DEVELOPMENT IN INFANTS AND CHILDREN. Designed to give the student exposure to the research methodology and findings relating to perceptual and attentional development beginning with birth. Major emphasis is placed on areas dealing with visual capacities, the influence of different variables on perceptual development, individual differences and the effects of early experience on perceptual-cognitive functioning, and the relationship of sensory integration to reading. Prerequisites: Psy 302, 306, 310, or permission of instructor.

PSY 515. (3) ASSESSMENT OF INTELLIGENCE. An exposure to the use and interpretation of the basic instruments for assessment of intelligence including the Stanford-Binet, WAIS, WISC, and WPPSI. Theories of intelligence, test development, clinical interpretation, and current research with the instruments are also discussed.

PSY 516. (3) PROJECTIVE TECHNIQUES. A survey and evaluation of the use and interpretation of the major tests used to assess personality and psychopathology including MMPI, Rorschach, TAT. Test development, theoretical rationale and research on the instrument are also discussed. Prerequisite: Psy 567, 569.

PSY 521. (3) DEVELOPMENTAL PSYCHOLOGY. Theory and research on psychological development from conception to adolescence. Major emphasis will be on personality and social development including attachment and dependency, aggression, sex role learning, moral development, and cross-cultural socialization. Prerequisites: Psy 306 or equivalent or by permission of instructor.

PSY 522. (3) ADVANCED COGNITIVE PROCESSES. Basic research paradigms for the experimental investigation of cognitive processes will be discussed. Special attention will be given to the current information processing theories of cognition. Topics will include: selective attention, visual short-term memory, pattern recognition, encoding processes, imagery, search and retrieval processes, theories of human memory, and cerebral dominance. Consideration will be given primarily to current research literature. Prerequisite: Permission of instructor.

PSY 523. (3) GROUP PSYCOTHERAPY. A study of group theory, its origins and applications, and specific techniques related to group therapy, including a review of literature and research in the field. Prerequisite: Psy 568.

PSY 530. (3) BASIC PROCESSES IN LEARNING AND MEMORY. A survey of the fundamental paradigms, concepts, and findings in the area of human learning, including recall, recognition, serial learning, paired-associate learning, transfer of training, short-term memory, and language processing.

PSY 531. (3) CURRENT THEORIES IN LEARNING AND MEMORY. An in depth investigation of recent theoretical contributions to the area of human learning. Prerequisite: Psy 530.

PSY 532. (3) PERCEPTION. A systematic study of methods and research findings in the field of human perception, together with an evaluation of theoretical interpretations. Prerequisite: Psy 501 and permission of instructor.

PSY 533. (3) HUMAN INFORMATION PROCESSING. An overview of current psychological and artificial intelligence models of cognition. Topics will include coding mechanisms in the central nervous system; simulation of sensory processes and recognition; computer models of human memory; semantic information processing by man and machines; fast retrieval theories; recent theories of language comprehension and problem solving. Prerequisites: Psy 522 or Psy 530.

PSY 536. (3) PSYCHOLOGY IN PERSPECTIVE. An historical synthesis of modern psychology. The major systems and theories since 1850 are examined to achieve a structured overview of Psychology and to place it in a context of the other arts and sciences.

PSY 541 (3) COMPUTER APPLICATIONS TO BEHAVIORAL SCIENCE. A survey is made of several psychological studies in which the use of the computer was critical to the experimental design. Prerequisite: Psy 501, permission of instructor.

PSY 542. (1) CLERKSHIP IN INTERVIEWING. Practicum supervised experience in clinical interviewing as a preliminary to assessment, diagnosis, and/or treatment in addition to developing an understanding of the individual. Prerequisite: Permission of the instructor.

PSY 543. (1) CLERKSHIP IN PROJECTIVE TECHNIQUES. Practicum supervised experience in the use and interpretation of the various personality assessment instruments. A tandem requirement for all graduate clinical students taking Psy 516. Prerequisite: Psy 567, 569, permission of the instructor.

PSY 544. (1) CLERKSHIP IN INTELLIGENCE TESTING. Practicum supervised experience in the use and interpretation of intelligence tests with the aim of providing exposure to a wide variety of subjects. A tandem requirement for all graduate clinical students taking Psy 515. Prerequisite: Permission of the instructor.

PSY 545. (1) CLERKSHIP IN GROUP PSYCHOTHERAPY. Practicum supervised experience in the use and application of various techniques of group psychotherapy. A tandem requirement for all graduate clinical students taking Psy 523. Prerequisite: Psy 568, permission of the instructor.

PSY 546. (1) CLERKSHIP IN INDIVIDUAL PSYCHOTHERAPY. Practicum supervised experience in the use and application of various techniques used in individual psychotherapy. A tandem requirement for all graduate clinical students taking Psy 571. Prerequisite: Psy 568, permission of the instructor.

PSY 548. (1) CLERKSHIP IN FAMILY COUNSELING. Practicum supervised experience in the use and application of various techniques associated with child-family psychotherapy. Prerequisite: Permission of the instructor.

PSY 549. (1) CLERKSHIP IN BEHAVIOR THERAPY. Practicum supervised experience in the use and application of behavioral therapy techniques. A tandem requirement for all graduate clinical students taking Psy 572. Prerequisite: Psy 568, permission of the instructor.

PSY 554. (3) RESEARCH IN CLINICAL PSYCHOLOGY. Based on a systematic study of the theoretical constructs of psychology and their applications to research in the clinical area, including problems of inference and methodology, the course provides an exposure and evaluation of research in the major areas of clinical psychology. Prerequisite: Psy 501, permission of the instructor.

PSY 565. (3) PSYCHOPHYSIOLOGY. The neurophysiology of attention, sensation, perception, emotion, learning, memory, and motor control. Electrophysiological indicants and cybernetical analyses are emphasized.

PSY 567. (3) THEORIES OF PERSONALITY. A survey and critical evaluation of contemporary personality theories integrating their assumptions and associated research findings into a comprehensive view of the person.

PSY 568. (3) THEORIES OF PSYCHOTHERAPY. A survey and critical analysis of the major current theories of psychotherapy integrating their contributions into a more diversified, functional, and adaptable approach to therapy. Prerequisite: Psy 567, 569.

PSY 569. (3) THEORY AND RESEARCH IN PSYCHOPATHOLOGY. Designed to acquaint the student with major theories on the etiology of the various behavior disorders, using the standard classification system. Theoretical and empirical research on the symptoms and dynamics of these disorders will be presented and evaluated.

PSY 571. (3) INDIVIDUAL PSYCHOTHERAPY: THEORY AND PRACTICE. A survey of approaches to individual psychotherapy placing emphasis on the development of specific therapeutic skills stemming from relevant empirical findings and related to theoretical and ethical issues inherent in various views of psychotherapy. Prerequisites: Psy 567, 568.

PSY 572. (3) BEHAVIOR THERAPY: THEORY AND TECHNIQUES. A survey of the various behavioral therapy techniques and their theoretical and experimental origins. Prerequisite: Psy 568.

PSY 585. (3) EXPERIMENTAL SOCIAL PSYCHOLOGY. Develop an understanding and working knowledge of scientific method in general and social psychology methods in specific. Demonstrate an ability to plan, conduct, and report on investigations in social psychology. Stress is placed on applying design methods to concepts and issues relevant to social psychology. Prerequisite: Psy 302, 310, 408.

PSY 586. (3) SOCIAL PSYCHOLOGY APPLIED TO COMMUNITY PROBLEMS. The course will address itself to such topics as crime, drug abuse, alcoholism, poverty, race relations, and mental health. Students will learn about the nature of these problems, as well as what social psychologists can contribute to their solution, through readings and actual field work. Students will be required to contribute a few hours of their time each week to a community organization that addresses itself to one or more of these problems, and at the end of the semester they will write a paper on their experiences. Prerequisite: Psy 585.

PSY 587. (3) SOCIAL INFLUENCES AND GROUP DYNAMICS. The course combines two major areas of social psychology, social influence and group dynamics, since much of what occurs in groups results from a process of mutual influence. Topics to be covered include group problem-solving, behavioral and hysterical contagion, the classic conformity research, and social facilitation. Students will be required to design an experiment in the form of a research proposal. Prerequisite: Psy 585.

PSY 588. (3) INTERPERSONAL PROCESSES. This course will examine some prominent subareas of social psychology. Persons pursuing advanced degrees in social psychology should be familiar with the theories and phenomena to be covered. Topics will include interpersonal attraction, attribution, social exchange theories, person perception, the acquaintanceship process and ingratiation. Prerequisite: Psy 585 or permission of instructor.

PSY 589. (3) ATTITUDES. This seminar surveys definitions of attitudes and related concepts (e.g., beliefs), standard scales (e.g., equal-interval), recent scaling models (e.g., unfolding), and artifacts of persuasion research (e.g., suspicion). Both classical and recent studies of attitude formation and change are critically examined for their support of dominant theories of persuasion. Prerequisite: Psy 585.

PSY 592. (3) SEMINAR IN STATISTICS. To give the student a working knowledge of specialized statistical techniques such as analysis of variance, nonparametric statistics, correlational methods, etc. The specific statistical technique covered in the course may be different from one offering to the next depending upon the interests and desires of the graduate students and the judgments of the departmental faculty. Prerequisite: Psy 501.

PSY 594. (3) ADVANCED QUANTITATIVE METHODS IN PSYCHOLOGY. Quantitative techniques used in mathematical models and theories will be covered with applications to particular psychological theories. Emphasis will be on the breadth of applications of quantitative methods in psychology in many areas.

PSY 595. (1-3) SEMINAR IN SPECIAL TOPICS IN PSYCHOLOGY. Will cover various topics of special interest to the faculty and students. Will provide an intensive critical evaluation of the appropriate literature in the field.

PSY 596.(1-3) EXPERIMENTAL RESEARCH. Individual graduate students explore particular research areas. Under guidance of the instructor, research projects are formulated and conducted. Project reports are required. May be repeated. Prerequisite: Permission of instructor.

PSY 597. (1-3) READINGS. Designed for individual, student-faculty study in a specialized area of interest. Topic and criteria for evaluation to be specified prior to registration.

PSY 599. (3) THESIS. A relevant and creative research problem incorporating an appropriate review of theory and literature, and demonstrating competence in the application of research methodology. Required of all graduate students.

Theological Studies (THL)

Rev. Matthew F. Kohmescher, S.M., *Chairman*
Dr. Richard A. Boulet, *Director, Graduate Programs*

THL 501. (3) BIBLICAL HEBREW. An introduction to the morphology and syntax of biblical hebrew designed to facilitate the handling of basic tools and the reading of simple prose texts.

THL 502. (3) BIBLICAL GREEK. An introduction to Koine (NT) Greek. Vocabulary, Grammar, and Syntax. Selective readings of New Testament texts.

THL 506. (3) ASIAN RELIGIONS. A consideration of Hinduism and Buddhism, with some attention to Taoism and Confucianism. Essence and development of these traditions, and theological reflection upon their important for and relation to Christian faith.

THL 510. (3) CHRISTIAN DOCTRINE IN THE EARLY CHURCH. An analysis of the development of doctrine from the sub-apostolic age to the beginning of the Middle Ages. Areas covered include: The Apostolic Fathers. The Apologists. Gnosticism. Irenaeus. Marcion. Tertullian. The Schools of Antioch, Alexandria, and Cappadocia. John of Damascus.

THL 515. (3) FATHERS OF THE CHURCH. An analysis of the life and thought of individual Fathers of the Church. May be taken more than once. 1. Augustine, 2. Origen.

THL 520. (3) HISTORY AND THEOLOGY OF THE MEDIEVAL CHURCH. A treatment of the Early Medieval foundations, the Carolingian Renaissance, the preparation of the Eleventh and Twelfth Centuries, as well as the Post-Thirteenth Century movement toward nominalism, to give perspective to the High Scholasticism of the 13th Century.

THL 523. (3) TRENT TO VATICAN II. An historical account of Christianity's theological response to the major Reformers and of further theological developments of Christianity in the context of break-throughs in Philosophy, Science, and Political Revolutions up to Vatican II.

THL 524. (3) PROTESTANT CHRISTIANITY. A survey of the development of Protestant Thought from the Reformation to the present. An analysis, via their own writings and their historical context, of selected Protestant theologians, such as Luther, Calvin, Knox, Cranmer, Schleiermacher, Ritschl, Harnack and Barth.

THL 542. (3) OLD TESTAMENT BACKGROUNDS. An introduction to Ancient Near Eastern Studies, a survey of the literature and the relationship to the Old Testament with special attention to selected topics. May be taken more than once.

THL 544. (3) OLD TESTAMENT EXEGESIS. A critical and exegetical study of selected writings of the Old Testament. May be taken more than once. 1. Hexateuch, 2. Historical Books, 3. Prophets, 4. Psalms, 5. Wisdom Literature, 6. Apocalyptic Literature.

THL 547. (3) OLD TESTAMENT THEOLOGY. An examination of the discipline of Old Testament Theology. Special consideration will be given to the relationship of history and theology.

THL 551. (3) NEW TESTAMENT BACKGROUNDS. A thorough study of selected individual points, e.g. Gnosticism, Qumran, etc., which are needed for an understanding of the New Testament. May be taken more than once.

THL 552. (3) THE QUESTIONS OF THE HISTORICAL JESUS. A detailed consideration of two major problem areas of New Testament interpretation, the complex of issues surrounding the question of the historical Jesus and the new hermeneutic, studying them in their historical perspective, present state of development and possible future directions.

THL 554. (3) NEW TESTAMENT EXEGESIS. A critical and exegetical study of selected writings of the New Testament. May be taken more than once. 1. Synoptics, 2. Luke-Acts, 3. John, 4. Pauline Corpus.

THL 557. (3) NEW TESTAMENT THEOLOGY. A thorough study of one theme in the theology of the New Testament. May be taken more than once.

THL 560. (3) THEOLOGICAL MOVEMENTS. A study of selected movements in theology in the 19th and 20th centuries or of the life and work of selected modern theologians. May be taken more than once.

THL 564. (3) THE CHRISTIAN DOCTRINE OF GOD. This course will concentrate primarily on the recent discussion about God, examining the major options in contemporary theology, including the theologies of the "death of God."

THL 565. (3) CHRISTOLOGY. An examination of the problems faced by contemporary theologians in discussing Jesus and his significance for Christian faith, and many of the solutions offered to these problems.

THL 566. (3) ECCLESIOLOGY. An in-depth study of selected teachings on the nature, structure, mission of the Church and her relationship to other Christian churches, to world religions and to the world.

THL 567. (3) SACRAMENTAL THEOLOGY. A detailed study of the principle of sacramentality and of the individual sacraments accenting the historical developments of each and the contemporary renewal.

THL 569. (3) MARIAN QUESTION TODAY. A detailed treatment of selected issues of contemporary interest relating to the role of the Virgin Mary in the history of salvation. May be taken more than once.

THL 570. (3) LITURGY. A study of the theological perspective on the history and the future of the liturgy.

THL 572. (3) APPROACHES TO MORALITY. An attempt to establish the foundations of Christian morality, consisting of an historical survey of approaches and developments from the New Testament period to the present.

THL 573. (3) EVOLUTION AND ETHICS. The contemporary theology of Christian existence as a whole, stressing the conscious unity of existence; the implications of evolution for theology and ethics.

THL 574. (3) THEOLOGY OF HOPE. A study of the development and implications of the new theology of hope.

THL 581. (3) THEOLOGY OF REVELATION. An in-depth study of God's self-disclosure to His people as found in Scripture, Tradition, and the living experience of the Church immersed in history.

THL 582. (3) RELIGIOUS EDUCATION IN CONTEXT. An analysis, discussion and treatment of key ideas concerning religious education with an emphasis on their recent history. Treatment of present institutional and structural problems. (Presupposes a course in the theology of revelation.)

THL 583. (3) RELIGIOUS PSYCHOLOGY. A study of the human response to God in the light of contemporary psychology. The implications for catechesis in the various stages of human development, in the process of conversion and commitment, and in the crises of faith.

THL 584. (3) CONTEMPORARY CATECHETICAL PROCESSES. A study of the role of structure in catechesis in the light of those used by effective centers of catechesis, especially in the U.S.A. An approach to the understanding and evaluation of life experiences and intuitional insights as to content and method in the relationship established by structure.

THL 585. (?) PASTORAL COUNSELING. A brief study of the methods of counseling with emphasis upon those modes most in practice today. A concentration on the major problems faced by a counselor in the pastoral area.

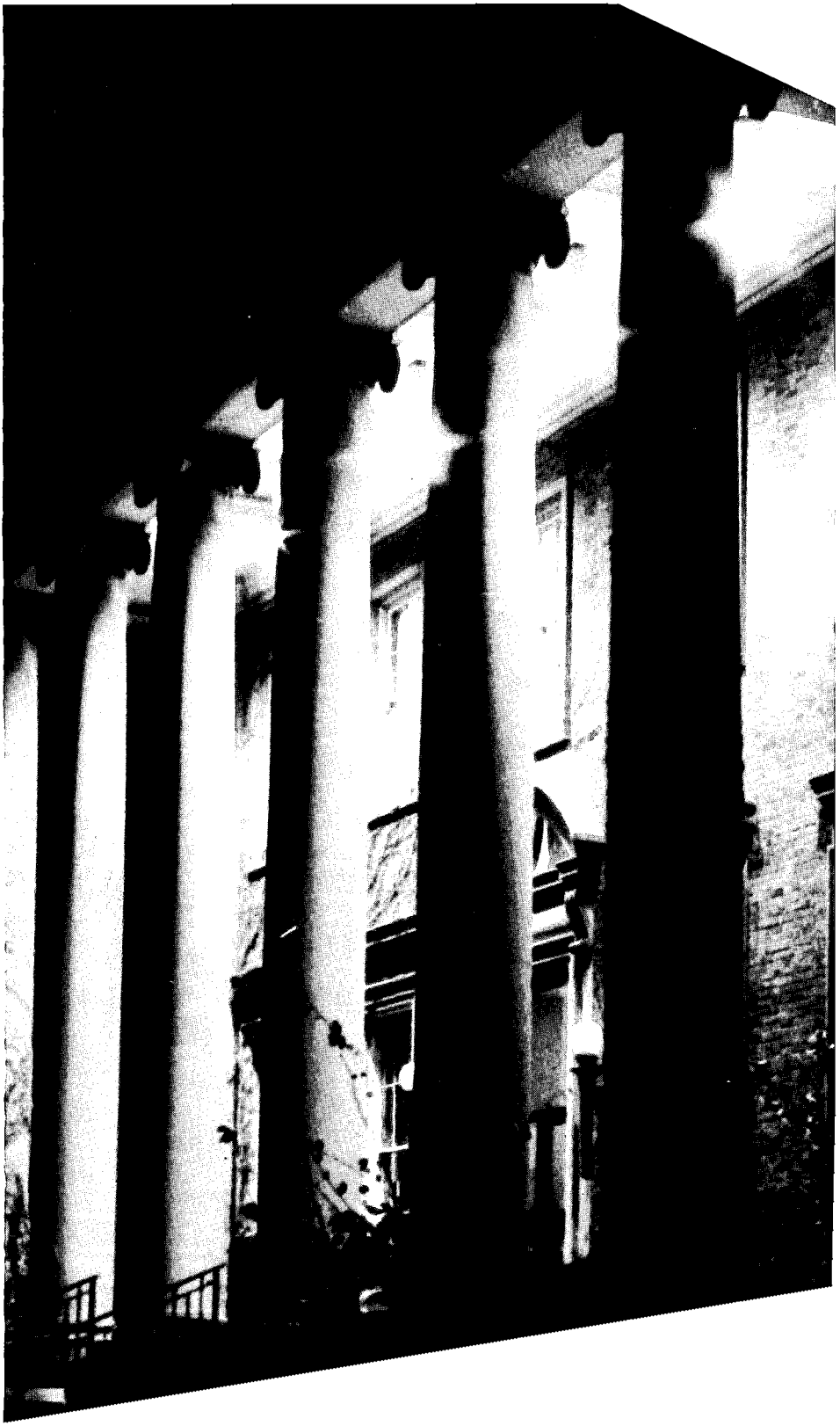
THL 586. (3) LEADERSHIP IN PARISH MINISTRY. A study of the traditional parish structure against the background of biblical and historical perspectives of the local church. An examination of the forces for change at work in the contemporary parish with an effort, out of the theoretical framework of leadership and administration, to assist the student to develop a philosophy and strategy of leadership related to his situation.

THL 590. (3) SELECTED QUESTIONS. A study of specific questions and developments in biblical, historical, or catechetical systematic theology. May be taken more than once.

THL 592. (1-6) CONTEMPORARY ISSUES. A graduate workshop and/or seminar investigating and analyzing a specific area of theology and interdisciplinary scholarship concerning contemporary issues.

THL 593. (1-3) DIRECTED STUDY. A directed study in depth of a particular theologian, problem, or historical period. May be taken more than once.

THL 599. (6) THESIS.



IX Personnel

OFFICERS OF ADMINISTRATION

President.....Very Rev. Raymond A. Roesch, S.M.
Vice President for Administration and Planning.....Rev. George B. Barrett, S.M.
Vice President for University Relations.....Thomas J. Frericks
Assistant to Vice President for University Relations.....Rev. John P. Harrington, S.M.
Vice President for Academic Affairs and Provost.....Rev. Charles J. Lees, S.M.
Assistant Provost: Center for Interdisciplinary Studies.....James N. Nesmith
Vice President for Services and Business Manager.....Joseph J. Mervar, S.M.
Assistant to the President.....Elmer C. Lackner, S.M.
Administrative Assistant to the President.....Wilbur E. Showalter
Director of Institutional Studies.....Dr. Wilfred J. Steiner
Secretary to the President.....Mrs. Mary Ann Krapf

ACADEMIC AFFAIRS

President, Academic Senate.....Rev. Charles J. Lees, S.M.
Dean for Graduate Studies and Research.....Dr. Joseph W. Stander, S.M.
Dean, College of Arts and Sciences.....Dr. Leonard A. Mann, S.M.
Associate Dean for Humanities College of Arts and Sciences.....Dr. Rocco M. Donatelli
Dean, School of Business Administration.....William J. Hoben
Director, MBA Program.....Dr. Norman George
Dean, School of Education.....Dr. Ellis A. Joseph
Dean, School of Engineering.....Dr. David C. Kraft
Associate Dean and Director of Graduate Studies and Research.....Dr. Jay D. Pinson
Director, Special Sessions.....Nora Duffy
Registrar.....Robert E. Donovan
Administrative Director, Admissions and Financial Aid.....James W. Hoover
Director, International Education.....Rev. Gabriel J. Rus, S.M.
Director of the University Libraries.....Raymond H. Nartker

STUDENT PERSONNEL SERVICES

Vice President for Student Development and Dean of Students.....Margaret M. Holland
Associate Dean of Students.....Rev. Francis Kenney, S.M.
Assistant Dean: Resident Life.....Thomas W. Anderson
Director of Guidance Center and Chief Psychologist.....Dr. Charles Scheidler
Medical Director.....Dr. John H. Dirckx

RESEARCH *Chairman, Research Council* .....Dr. Joseph W. Stander, S.M.
Director, Research Institute.....John R. Westerheide
Associate Director, Interdisciplinary Research....Robert R. Luthman

COMMITTEES

GRADUATE COUNCIL Dr. Joseph W. Stander, S.M., *Chairman;* Dr. B. J. Bedard, Dr. Louis Boehman, Dr. Norman George, Dr. Gerald E. Kerns, Robert R. Luthman, Ms. Polly B. Miller (student), Dr. Eugene K. Moulin, Ms. Johannah J. Sherrer, Dr. Ralph C. Steinlage, John J. Zotter (student).

RESEARCH COUNCIL Dr. Joseph W. Stander, S.M., Dr. John M. Bregenzer, Dr. William M. Gray, Dr. Subhash Jain, Dr. Arthur Z. Kovacs, Dr. Jay D. Pinson, James M. Ramsey, Dr. T. C. Rhee, Ms. Kathleen A. Ryan (student).

GRADUATE COMMITTEE OF ARTS AND SCIENCES Dr. Donald R. Geiger, S.M., *Chairman;* Dr. B. J. Bedard (English), Dr. Richard A. Boulet (Theology), Dr. Eliot J. Butter (Psychology), Dr. Leroy V. Eid (History), Dr. Thomas E. Gantner (Mathematics), Dr. Raymond M. Herbenick (Philosophy), Dr. W. Kenneth Howard (Political Science), Dr. Robert G. Keil (Chemistry), Dr. Gene E. Kiernan (Communication Arts), Dr. Edward J. Krall (Computer Science), Dr. Kitayun E. Marre (English), Dr. J. Michael O'Hare (Physics), Dr. Ralph C. Steinlage (Mathematics).

GRADUATE COMMITTEE OF THE SCHOOL OF BUSINESS ADMINISTRATION Dr. Norman C. George, *Chairman;* Richard Apostolik (student), Prof. Marion J. Eley, Dean William J. Hoben, Dr. Alan L. King, Dr. Richard E. McClaine, Prof. Hugh Stevenson, Prof. John E. Weiler.

GRADUATE COMMITTEE OF THE SCHOOL OF EDUCATION Dr. Ellis A. Joseph, *Chairman;* Dr. M. Audrey Bourgeois, Dr. Simon J. Chavez, Dr. Bernard C. Diethorn, S.M., Dr. Doris A. Drees, Dr. Helen B. Frey, Dr. William Gray, Dr Rita E. Klosterman, Roger E. Kreighbaum, James B. LaVanche, Dr. Eugene K. Moulin, Dr. John R. O'Donnell.

GRADUATE COMMITTEE OF THE SCHOOL OF ENGINEERING Dr. Jay D. Pinson, *Chairman;* Dr. Louis I. Boehman, Dr. Landis S. Gephart, Dr. Seshadri Srinivasan, Dr. Karl J. Strnat, Dr. Robert A. Thomson.

GRADUATE FACULTY

College of Arts and Sciences

ABBOTT, LYNDON E., M.A., *Political Science*
ANDERSON, REV. WILLIAM P., Th.D., *Theological Studies*
ARONS, PETER L., Ph.D., *English*
AUGUST, EUGENE R., Ph.D., *English*
BAJPAI, P. K., Ph.D., *Biology*
BAKER, RICHARD R., Ph.D., *Philosophy*
BARNA, JAMES D., Ph.D., *Psychology*
BEAUREGARD, ERVING E., M.A., *History*
BEDARD, B. J., Ph.D., *English*
BIERSACK, GEORGE C., M.A., *Communication Arts*
BOULET, RICHARD A., Ph.D., *Theological Studies*
BUECHE, FREDERICK J., Ph.D., *Physics*
BUTTER, ELIOT J., Ph.D., *Psychology*
CARTAGENOVA, GONZALO, Ph.D., *Philosophy*
CHANTELL, CHARLES J., Ph.D., *Biology*
CHUDD, CLETUS, S.M., Ph.D., *Chemistry*
COCHRAN, BUD T., Ph.D., *English*
COLE, REV. WILLIAM J., S.M., S.T.D., *Theological Studies*
COONEY, JOSEPH J., Ph.D., *Biology*
COTHERN, CHARLES R., Ph.D., *Physics*
DaPOLITO, FRANK J., Ph.D., *Psychology*
DIESKA, JOSEPH L., Ph.D., *Philosophy*
EID, LEROY V., Ph.D., *History*
EVESLAGE, SYLVESTER L., Ph.D., *Chemistry*
FOX, B. LAWRENCE, Ph.D., *Chemistry*
FRATINI, ALBERT V., Ph.D., *Chemistry*
FROST, REV. WILLIAM, S.T.D., *Theological Studies*
GANTNER, THOMAS E., Ph.D., *Mathematics*
GEIBEL, JAMES W., Ph.D., *English*
GEIGER, DONALD R., S.M., Ph.D., *Biology*
GORTON, ROBERT B., Ph.D., *Mathematics*
GRAHAM, THOMAS, Ph.D., *Physics*
HARWOOD, PHILIP J., Ph.D., *Communcation Arts*
HENNINGER, FRANCIS J., Ph.D., *English*
HERBENICK, RAYMOND M., Ph.D., *Philosophy*
HOWARD, W. KENNETH, Ph.D., *Political Science*
JACOBSON, MARSHA B, Ph.D., *Psychology*
JAFFEE, OSCAR C., Ph.D., *Biology*
KEIL, ROBERT G., Ph.D., *Chemistry*
KEPES, JOSEPH J., Ph.D., *Physics*
KERNS, GERALD E., Ph.D., *Political Science*
KIERNAN, GENE E., Ph.D., *Communication Arts*
KOHMESCHER, REV. MATTHEW F., S.M., S.T.D., *Theological Studies*
KNACHEL, HOWARD C., Ph.D., *Chemistry*
KUNKEL, JOSEPH C., Ph.D., *Philosophy*
LACHAPELLE, RENE C., Ph.D., *Biology*
LAPITAN, ANTONIO, Ph.D., *Political Science*
L'HEUREUX, CONRAD E., Ph.D., *Theological Studies*
LUCIER, JOHN J., S.M., Ph.D., *Chemistry*
LUDWIGSEN, KRISTINA R., Ph.D., *Psychology*
MANN, RONALD A., Ph.D., *Physics*
MARAS, RAYMOND J., Ph.D., *History*
MARRE, KITAYUN, Ph.D., *English*
MARRE, LOUIS A., M.A., *English*
MATHIAS, FRANK A., Ph.D., *History*
McCARTHY, REV. ADRIAN J., S.M., Ph.D., *English*
McCLOSKY, JOHN W., Ph.D., *Mathematics*
McDOUGALL, KENNETH J., Ph.D., *Biology*
MEANS, MICHAEL H., Ph.D., *English*
MONASTERIO, XAVIER O., Ph.D., *Philosophy*
MUSHENHEIM, HAROLD G., S.M., Ph.D., *Mathematics*

NERSOYAN, H. JAMES, Ph.D., *Philosophy*
NOLAND, GEORGE B., Ph.D., *Biology*
O'HARE, J. MICHAEL, Ph.D., *Physics*
PATROUCH, JOSEPH F., Ph.D., *English*
PATYK, JOZEF, Ph.D., *Political Science*
POLZELLA, DONALD J., M.A., *Psychology*
POTOCZNY, HENRY B., Ph.D., *Mathematics*
POPP, RICHARD J., Ph.D., *Psychology*
RAMSEY, JAMES M., M.S., *Biology*
RHEE, TONG-CHIN, Ph.D., *History*
RICHARDS, WILLIAM M., Ph.D., *Philosophy*
ROTTON, JAMES G., Ph.D., *Psychology*
RUFF, LAWRENCE A., Ph.D., *English*
RUPPEL, GEORGE J., S.M., Ph.D., *History*
SCHNEIDER, JAMES R., Ph.D., *Physics*
SCHWELITZ, FAYE D., Ph.D., *Biology*
SCHRAUT, KENNETH C., Ph.D., *Mathematics*
SOFFER, GAD, Ph.D., *History*
STEINLAGE, RALPH C., Ph.D., *Mathematics*
TIBBETTS, PAUL E., Jr., M.A., *Philosophy*
TORTORIELLO, THOMAS R., Ph.D., *Communication Arts*
TRENT, JUDITH S., Ph.D., *Communication Arts*
WALSH, JOSEPH H., Ph.D., *Chemistry*
WOLFF, FLORENCE I., Ph.D., *Communication Arts*
WEATHERLY, MICHAEL, Ph.D., *Communication Arts*
YANEY, PERRY P., Ph.D., *Physics*

St. Leonard Seminary
Centerville, Ohio

HEISE, REV. JORIS, O.F.M., M.A.
KISTNER, REV. HILLARION, O.F.M., S.T.D., S.S.L.
LANDINI, REV. LAWRENCE, O.F.M., D.H.E.
LOHKAMP, REV. NICHOLAS, O.F.M., S.T.D.

School of Business Administration

BERGER, ROBERT N., M.A., J.D., *Business Management*
CLARK, WILLARD C., Jr., M.B.A., C.P.A., *Accounting*
DARR, JOHN W., Ph.D., *Business Management*
ELEY, MARION J., M.B.A., C.P.A., *Accounting*
FUCHS, WALTER P., Ph.D., *Business Management*
GEORGE, NORMAN, J.D., Ph.D., *Business Management*
HOBEN, WILLIAM J., M.B.A., C.P.A., *Accounting*
HOLT, ARTHUR L., Ph.D., *Business Management*
JAIN, SUBHASH C., Ph.D., *Marketing*
KING, ALAN L., Ph.D., *Marketing*
LEIMKUHLER, REV. EDWIN M., S.M., M.A., *Business Management*
MATLIN, GEORGE E., Ph.D., *Economics*
McCLAINE, RICHARD E., Ph.D., *Business Management*
MURPHY, HARRY C., M.A., *Marketing*
OYEN, DUANE B., Ph.D., *Economics*
RANEY, RUSSELL R., Ph.D., *Accounting*
RAPP, JOHN E., Ph.D., *Economics*
RODGERS, EDWARD W., M.B.A., C.P.A., *Accounting*
SANFORD, ROBERT G., M.B.A., C.P.A., *Accounting*
SNYDER, BARTH J., M.A., J.D., *Business Management*
STEPHENSON, HUGH, M.B.A., *Business Management*
WEILER, JOHN E., Ph.D., *Economics*
WINGER, BERNARD J., M.A., C.P.A., *Economics*
WISE, SPENCE L., M.B.A., C.P.A., *Accounting*

School of Education

ANDERSON, GLADYS M., Ph.D., *Education*
ANDERSON, GORDON S., Ed.D., *Elementary Education*
BOURGEOIS, M. AUDREY, Ph.D., *Education*
BRITT, JOHN F., Ph.D., *Education*
CHAVEZ, SIMON J., Ed.D., *Education*
DAILY, FRANCES M., Ph.D., *Elementary Education*
DIETHORN, BERNARD C., S.M., D.Ed., *School Administration and Counseling*
DREES, DORIS A., Ph.D., *Physical and Health Education*
EDGINGTON, ORMAN R., Ph.D., *Secondary Education*
FAERBER, LOUIS J., S.M., Ph.D., *Education*
FRYE, HELEN B., Ph.D., *Education*
GAY, JAMES E., Ed.D., *Secondary Education*
GEIGER, JOHN O., Ph.D., *Foundations of Education*
GRAY, WILLIAM M., Ed.D., *Foundations of Education*
JOSEPH, ELLIS A., Ph.D., *Education*
KLOSTERMAN, RITA E., Ph.D., *Education*
KRIEGBAUM, ROBERT E., M.A., *Education*
LAVANCHE, JAMES B., M.S., *Physical and Health Education*
LEONARD, MARY T., D.Ed., *Physical and Health Education*
LUTZ, PAUL N., Ph.D., *Elementary Education*
MORTON, M. BYRON, M.Ed., *Education*
MOULIN, EUGENE K., Ph.D., *Counselor Education*
O'DONNELL, JOHN R., Ed.D., *Education*
PETIT, LORETTA M., O.P., D.Ed., *Education*
SCHLEPPI, JOHN R., Ph.D., *Health and Physical Education*
STANLEY, PHILIP L., D.Ed., *Physical and Health Education*

School of Engineering

BAUER, PAUL T., Ph.D.,
Mechanical Engineering

BOEHMAN, LOUIS I., Ph.D.,
Mechanical Engineering

BOGNER, FRED K., Ph.D.,
Mechanical Engineering

BROWNE, VANCE d'A., Ph.D.,
Mechanical Engineering

CHUANG, HENRY N., Ph.D.,
Mechanical Engineering

CRISP, JOHN N., Ph.D.,
Mechanical Engineering

CROUCH, JACK G., Ph.D.,
Mechanical Engineering

DAVISON, JOSEPH E., Ph.D.,
Mechanical Engineering

FITZ, RAYMOND L., S.M., Ph.D.,
Electrical Engineering and Engineering Management

FUCHS, WALTER P., Ph.D.,
Engineering Management

GEPHART, LANDIS S., Ph.D.,
Engineering Management

HARMER, RICHARD S., Ph.D.,
Mechanical Engineering

KOVACS, ARTHUR Z., Ph.D.,
Technical Studies and Services

KRAFT, DAVID C., Ph.D.,
Civil Engineering

LEWIS, DONALD E., Ph.D.,
Electrical Engineering

MINARDI, JOHN E., Ph.D.,
Mechanical Engineering

OLINGER, JOHN L., Ph.D.,
Chemical Engineering

PAYNE, ELMER H., M.S.,
Civil Engineering

PINSON, JAY D., Ph.D.,
Mechanical Engineering

RAY, ALDEN E., Ph.D.,
Mechanical Engineering

RYCKMAN, SEYMOUR J., M.S.,
Civil Engineering

SCHAUER, JOHN J., Ph.D.,
Mechanical Engineering

SCHMID, MERLE D., Ph.D.,
Technical Studies and Services

SCHMIDT, BERNHARD M., Ph.D.,
Electrical Engineering

SMITH, HOWARD E., Ph.D.,
Mechanical Engineering

SRINIVASAN, SESHADRI, Ph.D.,
Chemical Engineering

STRNAT, KARL J., Dr. Techn.,
Electrical Engineering

THOMSON, ROBERT A., Ph.D.,
Engineering Mechanics

TREY, THOMAS J., Ph.D.,
Chemical Engineering

WURST, JOHN C., Ph.D.,
Mechanical Engineering

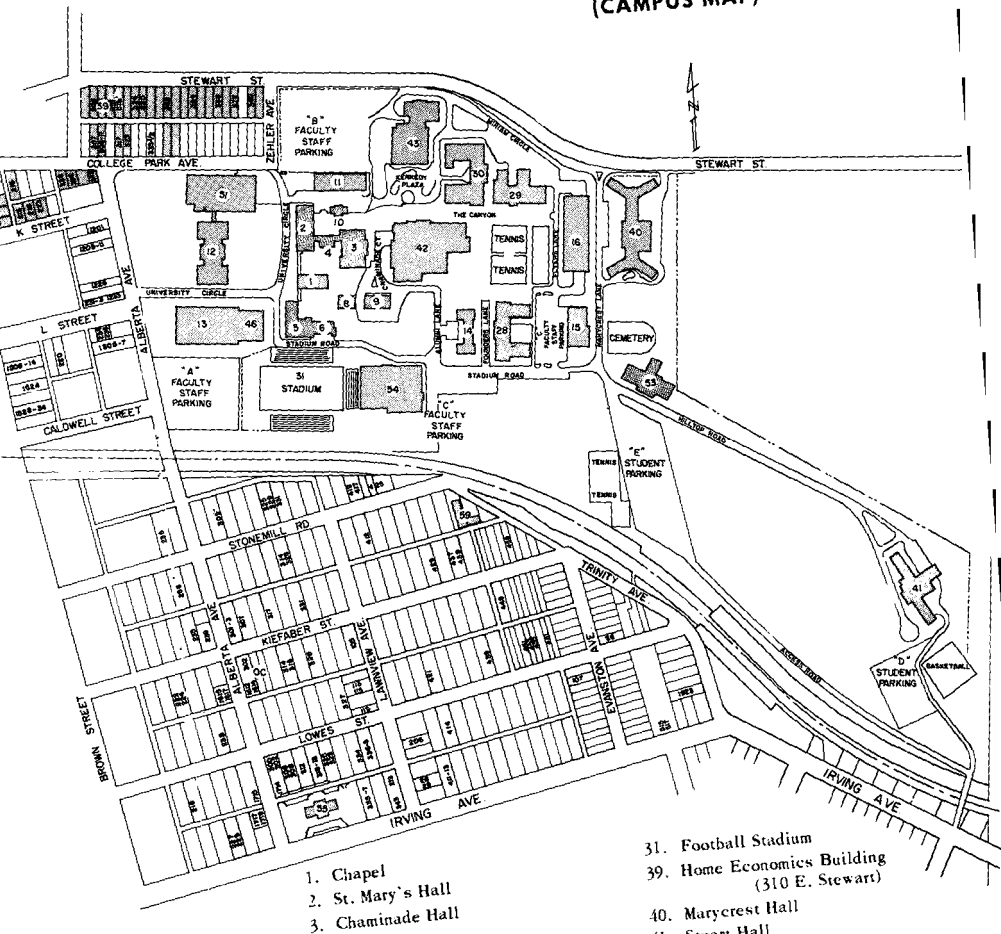
Office for Graduate Studies St. Mary's Hall—Room 200 Telephone 229-2343	Office hours: 8:30 a.m. to 12:00 noon 1:00 p.m. to 4:30 p.m. After 4:30 p.m., by appointment
Dr. Joseph W. Stander, S.M. Dean For Graduate Studies and Research St. Mary's Hall—Room 202 Telephone 229-2246	Office hours: Please arrange an appointment
Dr. Leonard A. Mann, S.M. Dean, College of Arts and Sciences Old Marian Library Building Telephone 229-2611	Office hours: Please arrange an appointment
Dr. Ellis A. Joseph Dean, School of Education Chaminade Hall—Room 106 Telephone 229-3146	Office hours: Please arrange an appointment
Dr. David C. Kraft Dean, School of Engineering Engineering Research Bldg.—Room 407 Telephone 229-2736	Office hours: Please arrange an appointment
William J. Hoben Dean, School of Business Administration Miriam Hall—Room 230 Telephone 229-3731	Office hours: Please arrange an appointment

Index

NOTES

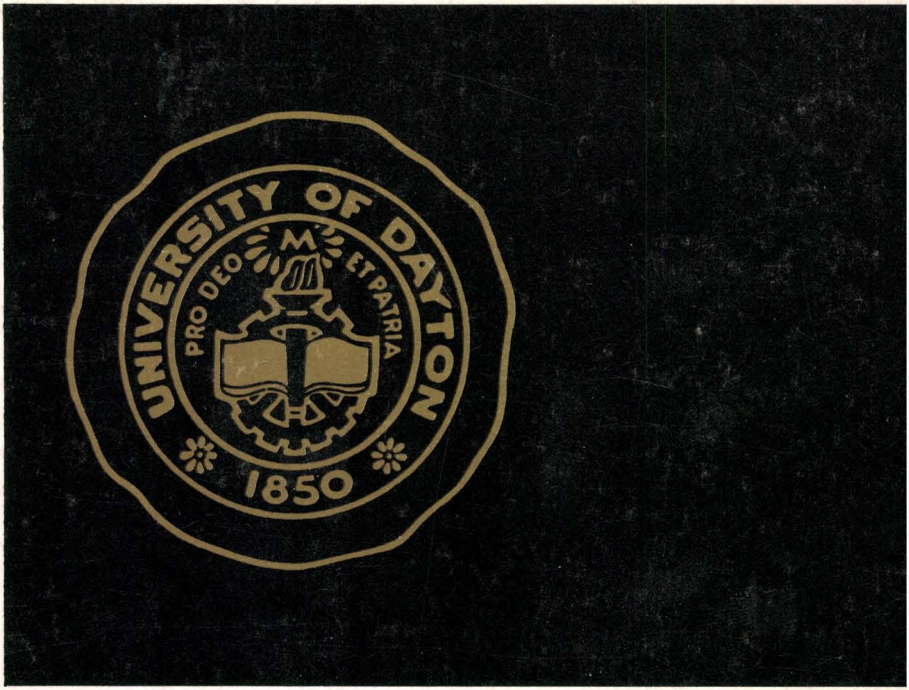
NOTES

UNIVERSITY OF DAYTON
(CAMPUS MAP)



1. Chapel
2. St. Mary's Hall
3. Chaminade Hall
4. Arcade
5. St. Joseph's Hall
6. Zehler Hall
8. Liberty Hall
9. Power House
10. Post Office
11. Old Gymnasium
12. Albert Emanuel
13. Fieldhouse
14. Alumni Hall
15. R.O.T.C. Building
16. Mechanical Engineering Building
28. Founder's Hall
29. Wohlleben Hall
30. Sherman Hall
31. Football Stadium
39. Home Economics Building (310 E. Stewart)
40. Marycrest Hall
41. Stuart Hall
42. Kennedy Memorial Union
43. Miriam Hall
46. The Pit
51. New Library Building
53. C.H. Gosiger Memorial Health Center
54. Kettering Engineering & Research Building
55. Campus South
59. Benisek Hall (Trinity at Stonemill)

OC Off Campus Housing Office (304 Kiefaber Street)



University of Dayton